INSTALLATION AND OPERATION MANUAL

RICi-622GE

Gigabit Ethernet over 2 x STM-4/OC-12 Network Termination Unit

Version 1.0

EtherAccess

RAD

data communications

The Access Company

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Notice

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Limited Warranty

RAD warrants to DISTRIBUTOR that the hardware in the RICi-622GE to be delivered hereunder shall be free of defects in material and workmanship under normal use and service for a period of twelve (12) months following the date of shipment to DISTRIBUTOR.

If, during the warranty period, any component part of the equipment becomes defective by reason of material or workmanship, and DISTRIBUTOR immediately notifies RAD of such defect, RAD shall have the option to choose the appropriate corrective action: a) supply a replacement part, or b) request return of equipment to its plant for repair, or c) perform necessary repair at the equipment's location. In the event that RAD requests the return of equipment, each party shall pay one-way shipping costs.

RAD shall be released from all obligations under its warranty in the event that the equipment has been subjected to misuse, neglect, accident or improper installation, or if repairs or modifications were made by persons other than RAD's own authorized service personnel, unless such repairs by others were made with the written consent of RAD.

The above warranty is in lieu of all other warranties, expressed or implied. There are no warranties which extend beyond the face hereof, including, but not limited to, warranties of merchantability and fitness for a particular purpose, and in no event shall RAD be liable for consequential damages.

RAD shall not be liable to any person for any special or indirect damages, including, but not limited to, lost profits from any cause whatsoever arising from or in any way connected with the manufacture, sale, handling, repair, maintenance or use of the RICi-622GE, and in no event shall RAD's liability exceed the purchase price of the RICi-622GE.

DISTRIBUTOR shall be responsible to its customers for any and all warranties which it makes relating to RICi-622GE and for ensuring that replacements and other adjustments required in connection with the said warranties are satisfactory.

Software components in the RICi-622GE are provided "as is" and without warranty of any kind. RAD disclaims all warranties including the implied warranties of merchantability and fitness for a particular purpose. RAD shall not be liable for any loss of use, interruption of business or indirect, special, incidental or consequential damages of any kind. In spite of the above RAD shall do its best to provide error-free software products and shall offer free Software updates during the warranty period under this Agreement.

RAD's cumulative liability to you or any other party for any loss or damages resulting from any claims, demands, or actions arising out of or relating to this Agreement and the RICi-622GE shall not exceed the sum paid to RAD for the purchase of the RICi-622GE. In no event shall RAD be liable for any indirect, incidental, consequential, special, or exemplary damages or lost profits, even if RAD has been advised of the possibility of such damages.

This Agreement shall be construed and governed in accordance with the laws of the State of Israel.

Product Disposal

To facilitate the reuse, recycling and other forms of recovery of waste equipment in protecting the environment, the owner of this RAD product is required to refrain from disposing of this product as unsorted municipal waste at the end of its life cycle. Upon termination of the unit's use, customers should provide for its collection for reuse, recycling or other form of environmentally conscientious disposal.

General Safety Instructions

The following instructions serve as a general guide for the safe installation and operation of telecommunications products. Additional instructions, if applicable, are included inside the manual.

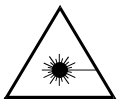
Safety Symbols

Warning

This symbol may appear on the equipment or in the text. It indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.

Danger of electric shock! Avoid any contact with the marked surface while the product is energized or connected to outdoor telecommunication lines.

Protective ground: the marked lug or terminal should be connected to the building protective ground bus.



Warning

Some products may be equipped with a laser diode. In such cases, a label with the laser class and other warnings as applicable will be attached near the optical transmitter. The laser warning symbol may be also attached.

Please observe the following precautions:

- Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter.
- Do not attempt to adjust the laser drive current.
- Do not use broken or unterminated fiber-optic cables/connectors or look straight at the laser beam.
- The use of optical devices with the equipment will increase eye hazard.
- Use of controls, adjustments or performing procedures other than those specified herein, may result in hazardous radiation exposure.

ATTENTION: The laser beam may be invisible!

In some cases, the users may insert their own SFP laser transceivers into the product. Users are alerted that RAD cannot be held responsible for any damage that may result if non-compliant transceivers are used. In particular, users are warned to use only agency approved products that comply with the local laser safety regulations for Class 1 laser products.

Always observe standard safety precautions during installation, operation and maintenance of this product. Only qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this product. No installation, adjustment, maintenance or repairs should be performed by either the operator or the user.

Handling Energized Products

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present inside certain products even when the power switch (if installed) is in the OFF position or a fuse is blown. For DC-powered products, although the voltages levels are usually not hazardous, energy hazards may still exist.

Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.

Unless otherwise specified, all products are intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective ground terminal. If a ground lug is provided on the product, it should be connected to the protective ground at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in grounded racks and cabinets.

Always make the ground connection first and disconnect it last. Do not connect telecommunication cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Some products may have panels secured by thumbscrews with a slotted head. These panels may cover hazardous circuits or parts, such as power supplies. These thumbscrews should therefore always be tightened securely with a screwdriver after both initial installation and subsequent access to the panels.

Connecting AC Mains

Make sure that the electrical installation complies with local codes.

Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Always connect the power cord first to the equipment and then to the wall socket. If a power switch is provided in the equipment, set it to the OFF position. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building installation.

In cases when the power distribution system is IT type, the switch must disconnect both poles simultaneously.

Connecting DC Power

Unless otherwise specified in the manual, the DC input to the equipment is floating in reference to the ground. Any single pole can be externally grounded.

Due to the high current capability of DC power systems, care should be taken when connecting the DC supply to avoid short-circuits and fire hazards.

DC units should be installed in a restricted access area, i.e. an area where access is authorized only to qualified service and maintenance personnel.

Make sure that the DC power supply is electrically isolated from any AC source and that the installation complies with the local codes.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Before connecting the DC supply wires, ensure that power is removed from the DC circuit. Locate the circuit breaker of the panel board that services the equipment and switch it to the OFF position. When connecting the DC supply wires, first connect the ground wire to the corresponding terminal, then the positive pole and last the negative pole. Switch the circuit breaker back to the ON position.

A readily accessible disconnect device that is suitably rated and approved should be incorporated in the building installation.

If the DC power supply is floating, the switch must disconnect both poles simultaneously.

Connecting Data and Telecommunications Cables

Data and telecommunication interfaces are classified according to their safety status.

The following table lists the status of several standard interfaces. If the status of a given port differs from the standard one, a notice will be given in the manual.

Ports	Safety Status
V.11, V.28, V.35, V.36, RS-530, X.21, 10 BaseT, 100 BaseT, Unbalanced E1, E2, E3, STM, DS-2, DS-3, S-Interface ISDN, Analog voice E&M	SELV Safety Extra Low Voltage: Ports which do not present a safety hazard. Usually up to 30 VAC or 60 VDC.
xDSL (without feeding voltage), Balanced E1, T1, Sub E1/T1	TNV-1 Telecommunication Network Voltage-1: Ports whose normal operating voltage is within the limits of SELV, on which overvoltages from telecommunications networks are possible.
FXS (Foreign Exchange Subscriber)	TNV-2 Telecommunication Network Voltage-2: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are not possible. These ports are not permitted to be directly connected to external telephone and data lines.
FXO (Foreign Exchange Office), xDSL (with feeding voltage), U-Interface ISDN	TNV-3 Telecommunication Network Voltage-3: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are possible.

Always connect a given port to a port of the same safety status. If in doubt, seek the assistance of a qualified safety engineer.

Always make sure that the equipment is grounded before connecting telecommunication cables. Do not disconnect the ground connection before disconnecting all telecommunications cables.

Some SELV and non-SELV circuits use the same connectors. Use caution when connecting cables. Extra caution should be exercised during thunderstorms.

When using shielded or coaxial cables, verify that there is a good ground connection at both ends. The grounding and bonding of the ground connections should comply with the local codes.

The telecommunication wiring in the building may be damaged or present a fire hazard in case of contact between exposed external wires and the AC power lines. In order to reduce the risk, there are restrictions on the diameter of wires in the telecom cables, between the equipment and the mating connectors.

Caution To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cords.

Attention Pour réduire les risques s'incendie, utiliser seulement des conducteurs de télécommunications 26 AWG ou de section supérieure.

Some ports are suitable for connection to intra-building or non-exposed wiring or cabling only. In such cases, a notice will be given in the installation instructions.

Do not attempt to tamper with any carrier-provided equipment or connection hardware.

Electromagnetic Compatibility (EMC)

The equipment is designed and approved to comply with the electromagnetic regulations of major regulatory bodies. The following instructions may enhance the performance of the equipment and will provide better protection against excessive emission and better immunity against disturbances.

A good ground connection is essential. When installing the equipment in a rack, make sure to remove all traces of paint from the mounting points. Use suitable lock-washers and torque. If an external grounding lug is provided, connect it to the ground bus using braided wire as short as possible.

The equipment is designed to comply with EMC requirements when connecting it with unshielded twisted pair (UTP) cables. However, the use of shielded wires is always recommended, especially for high-rate data. In some cases, when unshielded wires are used, ferrite cores should be installed on certain cables. In such cases, special instructions are provided in the manual.

Disconnect all wires which are not in permanent use, such as cables used for one-time configuration.

The compliance of the equipment with the regulations for conducted emission on the data lines is dependent on the cable quality. The emission is tested for UTP with 80 dB longitudinal conversion loss (LCL).

Unless otherwise specified or described in the manual, TNV-1 and TNV-3 ports provide secondary protection against surges on the data lines. Primary protectors should be provided in the building installation.

The equipment is designed to provide adequate protection against electro-static discharge (ESD). However, it is good working practice to use caution when connecting cables terminated with plastic connectors (without a grounded metal hood, such as flat cables) to sensitive data lines. Before connecting such cables, discharge yourself by touching ground or wear an ESD preventive wrist strap.

FCC-15 User Information

This equipment has been tested and found to comply with the limits of the Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the Installation and Operation manual, may cause harmful interference to the radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Emission Requirements

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Warning per EN 55022 (CISPR-22)

Warning	This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user will be required to take adequate measures.
Avertissement	Cet appareil est un appareil de Classe A. Dans un environnement résidentiel, cet appareil peut provoquer des brouillages radioélectriques. Dans ces cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.
Achtung	Das vorliegende Gerät fällt unter die Funkstörgrenzwertklasse A. In Wohngebieten können beim Betrieb dieses Gerätes Rundfunkströrungen auftreten, für deren Behebung der Benutzer verantwortlich ist.

Mise au rebut du produit

Afin de faciliter la réutilisation, le recyclage ainsi que d'autres formes de récupération d'équipement mis au rebut dans le cadre de la protection de l'environnement, il est demandé au propriétaire de ce produit RAD de ne pas mettre ce dernier au rebut en tant que déchet municipal non trié, une fois que le produit est arrivé en fin de cycle de vie. Le client devrait proposer des solutions de réutilisation, de recyclage ou toute autre forme de mise au rebut de cette unité dans un esprit de protection de l'environnement, lorsqu'il aura fini de l'utiliser.

Instructions générales de sécurité

Les instructions suivantes servent de guide général d'installation et d'opération sécurisées des produits de télécommunications. Des instructions supplémentaires sont éventuellement indiquées dans le manuel.

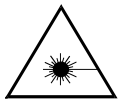
Symboles de sécurité

Avertissement

Ce symbole peut apparaitre sur l'équipement ou dans le texte. Il indique des risques potentiels de sécurité pour l'opérateur ou le personnel de service, quant à l'opération du produit ou à sa maintenance.

Danger de choc électrique ! Evitez tout contact avec la surface marquée tant que le produit est sous tension ou connecté à des lignes externes de télécommunications.

Mise à la terre de protection : la cosse ou la borne marquée devrait être connectée à la prise de terre de protection du bâtiment.



Avertissement

Certains produits peuvent être équipés d'une diode laser. Dans de tels cas, une étiquette indiquant la classe laser ainsi que d'autres avertissements, le cas échéant, sera jointe près du transmetteur optique. Le symbole d'avertissement laser peut aussi être joint.

Veuillez observer les précautions suivantes :

- Avant la mise en marche de l'équipement, assurez-vous que le câble de fibre optique est intact et qu'il est connecté au transmetteur.
- Ne tentez pas d'ajuster le courant de la commande laser.
- N'utilisez pas des câbles ou connecteurs de fibre optique cassés ou sans terminaison et n'observez pas directement un rayon laser.
- L'usage de périphériques optiques avec l'équipement augmentera le risque pour les yeux.
- L'usage de contrôles, ajustages ou procédures autres que celles spécifiées ici pourrait résulter en une dangereuse exposition aux radiations.

ATTENTION : Le rayon laser peut être invisible !

Les utilisateurs pourront, dans certains cas, insérer leurs propres émetteurs-récepteurs Laser SFP dans le produit. Les utilisateurs sont avertis que RAD ne pourra pas être tenue responsable de tout dommage pouvant résulter de l'utilisation d'émetteurs-récepteurs non conformes. Plus particulièrement, les utilisateurs sont avertis de n'utiliser que des produits approuvés par l'agence et conformes à la réglementation locale de sécurité laser pour les produits laser de classe 1.

Respectez toujours les précautions standards de sécurité durant l'installation, l'opération et la maintenance de ce produit. Seul le personnel de service qualifié et autorisé devrait effectuer l'ajustage, la maintenance ou les réparations de ce produit. Aucune opération d'installation, d'ajustage, de maintenance ou de réparation ne devrait être effectuée par l'opérateur ou l'utilisateur.

Manipuler des produits sous tension

Règles générales de sécurité

Ne pas toucher ou altérer l'alimentation en courant lorsque le câble d'alimentation est branché. Des tensions de lignes peuvent être présentes dans certains produits, même lorsque le commutateur (s'il est installé) est en position OFF ou si le fusible est rompu. Pour les produits alimentés par CC, les niveaux de tension ne sont généralement pas dangereux mais des risques de courant peuvent toujours exister.

Avant de travailler sur un équipement connecté aux lignes de tension ou de télécommunications, retirez vos bijoux ou tout autre objet métallique pouvant venir en contact avec les pièces sous tension.

Sauf s'il en est autrement indiqué, tous les produits sont destinés à être mis à la terre durant l'usage normal. La mise à la terre est fournie par la connexion de la fiche principale à une prise murale équipée d'une borne protectrice de mise à la terre. Si une cosse de mise à la terre est fournie avec le produit, elle devrait être connectée à tout moment à une mise à la terre de protection par un conducteur de diamètre 18 AWG ou plus. L'équipement monté en châssis ne devrait être monté que sur des châssis et dans des armoires mises à la terre.

Branchez toujours la mise à la terre en premier et débranchez-la en dernier. Ne branchez pas des câbles de télécommunications à un équipement qui n'est pas mis à la terre. Assurez-vous que tous les autres câbles sont débranchés avant de déconnecter la mise à la terre.

Connexion au courant du secteur

Assurez-vous que l'installation électrique est conforme à la réglementation locale.

Branchez toujours la fiche de secteur à une prise murale équipée d'une borne protectrice de mise à la terre.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A. Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A.

Branchez toujours le câble d'alimentation en premier à l'équipement puis à la prise murale. Si un commutateur est fourni avec l'équipement, fixez-le en position OFF. Si le câble d'alimentation ne peut pas être facilement débranché en cas d'urgence, assurez-vous qu'un coupe-circuit ou un disjoncteur d'urgence facilement accessible est installé dans l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si le système de distribution de courant est de type IT.

Connexion d'alimentation CC

Sauf s'il en est autrement spécifié dans le manuel, l'entrée CC de l'équipement est flottante par rapport à la mise à la terre. Tout pôle doit être mis à la terre en externe.

A cause de la capacité de courant des systèmes à alimentation CC, des précautions devraient être prises lors de la connexion de l'alimentation CC pour éviter des courts-circuits et des risques d'incendie.

Les unités CC devraient être installées dans une zone à accès restreint, une zone où l'accès n'est autorisé qu'au personnel qualifié de service et de maintenance.

Assurez-vous que l'alimentation CC est isolée de toute source de courant CA (secteur) et que l'installation est conforme à la réglementation locale.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A. Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A.

Avant la connexion des câbles d'alimentation en courant CC, assurez-vous que le circuit CC n'est pas sous tension. Localisez le coupe-circuit dans le tableau desservant l'équipement et fixez-le en position OFF. Lors de la connexion de câbles d'alimentation CC, connectez d'abord le conducteur de mise à la terre à la borne correspondante, puis le pôle positif et en dernier, le pôle négatif. Remettez le coupe-circuit en position ON.

Un disjoncteur facilement accessible, adapté et approuvé devrait être intégré à l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si l'alimentation en courant CC est flottante.

Glossary

Address	A coded representation of the origin or destination of data.
Agent	In SNMP, this refers to the managed system.
Analog	A continuous wave or signal (such as human voice).
ANSI	American National Standards Institute.
AWG	The American Wire Gauge System, which specifies wire width.
Balanced	A transmission line in which voltages on the two conductors are equal in magnitude, but opposite in polarity, with respect to ground.
Bandwidth	The range of frequencies passing through a given circuit. The greater the bandwidth, the more information can be sent through the circuit in a given amount of time.
Baud	Unit of signaling speed equivalent to the number of discrete conditions or events per second. If each signal event represents only one bit condition, baud rate equals bps (bits per second).
Bipolar	Signaling method in E1/T1 representing a binary "1" by alternating positive and negative pulses, and a binary "0" by absence of pulses.
Bit	The smallest unit of information in a binary system. Represents either a one or zero ("1" or "0").
bps (Bits Per Second)	A measure of data transmission rate in serial transmission.
Bridge	A device interconnecting local area networks at the OSI data link layer, filtering and forwarding frames according to media access control (MAC) addresses.
Buffer	A storage device. Commonly used to compensate for differences in data rates or event timing when transmitting from one device to another. Also used to remove jitter.
Bus	A transmission path or channel. A bus is typically an electrical connection with one or more conductors, where all attached devices receive all transmissions at the same time.
Byte	A group of bits (normally 8 bits in length).
Carrier	A continuous signal at a fixed frequency that is capable of being modulated with a second (information carrying) signal.

Cell	The 53-byte basic information unit within an ATM network. The user traffic is segmented into cells at the source and reassembled at the destination. An ATM cell consists of a 5-byte ATM header and a 48-byte ATM payload, which contains the user data.
Channel	A path for electrical transmission between two or more points. Also called a link, line, circuit or facility.
Clock	A term for the source(s) of timing signals used in synchronous transmission.
Congestion	A state in which the network is overloaded and starts to discard user data (frames, cells or packets).
Data	Information represented in digital form, including voice, text, facsimile and video.
Data Link Layer	Layer 2 of the OSI model. The entity, which establishes, maintains, and releases data-link connections between elements in a network. Layer 2 is concerned with the transmission of units of information, or frames, and associated error checking.
dBm	A measure of power in communications: the decibel in reference to one milliwatt (0 dBm = 1 milliwatt and -30 dBm = .001 milliwatt).
Decibel	See **dB**.
Diagnostics	The detection and isolation of a malfunction or mistake in a communications device, network or system.
Differential Delay	Differential delay is caused when traffic is split over different lines that may traverse shorter and longer paths. Products like the RAD IMX-2T1/E1 inverse multiplexer compensate for any differential delay (up to 64 msec) between the T1 lines, to properly reconstruct the original stream.
Digital	The binary ("1" or "0") output of a computer or terminal. In data communications, an alternating, non-continuous (pulsating) signal.
E3	The European standard for high speed digital transmission, operating at 34 Mbps.
Encapsulation	Encapsulating data is a technique used by layered protocols in which a low level protocol accepts a message from a higher level protocol, then places it in the data portion of the lower-level frame. The logistics of encapsulation require that packets traveling over a physical network contain a sequence of headers.
Ethernet	A local area network (LAN) technology which has extended into the wide area networks. Ethernet operates at many speeds, including data rates of 10 Mbps (Ethernet), 100 Mbps (Fast Ethernet), 1,000 Mbps (Gigabit Ethernet), 10 Gbps, 40 Gbps, and 100 Gbps.
Flow Control	A congestion control mechanism that results in an ATM system implementing flow control.

Frame	A logical grouping of information sent as a link-layer unit over a transmission medium. The terms packet, datagram, segment, and message are also used to describe logical information groupings.
Framing	At the physical and data link layers of the OSI model, bits are fit into units called frames. Frames contain source and destination information, flags to designate the start and end of the frame, plus information about the integrity of the frame. All other information, such as network protocols and the actual payload of data, is encapsulated in a packet, which is encapsulated in the frame.
Full Duplex	A circuit or device permitting transmission in two directions (sending and receiving) at the same time.
FXO (Foreign Exchange Office)	A voice interface, emulating a PBX extension, as it appears to the CO (Central Office) for connecting a PBX extension to a multiplexer.
FXS (Foreign Exchange Subscriber)	A voice interface, emulating the extension interface of a PBX (or subscriber interface of a CO) for connecting a regular telephone set to a multiplexer.
Gateway	Gateways are points of entrance and exit from a communications network. Viewed as a physical entity, a gateway is that node that translates between two otherwise incompatible networks or network segments. Gateways perform code and protocol conversion to facilitate traffic between data highways of differing architecture.
Half Duplex	A circuit or device capable of transmitting in two directions, but not at the same time.
Interface	A shared boundary, defined by common physical interconnection characteristics, signal characteristics, and meanings of exchanged signals.
IP Address	Also known as an Internet address. A unique string of numbers that identifies a computer or device on a TCP/IP network. The format of an IP address is a 32-bit numeric address written as four numbers from 0 to 255, separated by periods (for example, 1.0.255.123).
J1	Digital interconnection protocol similar to T1 and E1 used in Japan.
Jitter	The deviation of a transmission signal in time or phase. It can introduce errors and loss of synchronization in high speed synchronous communications.
Laser	A device that transmits an extremely narrow and coherent beam of electromagnetic energy in the visible light spectrum. Used as a light source for fiber optic transmission (generally more expensive, shorter lived, single mode only, for greater distances than LED).
Loopback	A type of diagnostic test in which the transmitted signal is returned to the sending device after passing through all or part of a communications link or network.

Manager	An application that receives Simple Network Management Protocol (SNMP) information from an agent. An agent and manager share a database of information, called the Management Information Base (MIB). An agent can use a message called a traps-PDU to send unsolicited information to the manager. A manager that uses the RADview MIB can query the RAD device, set parameters, sound alarms when certain conditions appear, and perform other administrative tasks.
Master Clock	The source of timing signals (or the signals themselves) that all network stations use for synchronization.
Multiplexer	At one end of a communications link, a device that combines several lower speed transmission channels into a single high speed channel. A multiplexer at the other end reverses the process. Sometimes called a mux. See **Bit Interleaving/Multiplexing**.
Network	(1) An interconnected group of nodes. (2) A series of points, nodes, or stations connected by communications channels; the collection of equipment through which connections are made between data stations.
Node	A point of interconnection to a network.
Packet	An ordered group of data and control signals transmitted through a network, as a subset of a larger message.
Payload	The 48-byte segment of the ATM cell containing user data. Any adaptation of user data via the AAL will take place within the payload.
Physical Layer	Layer 1 of the OSI model. The layer concerned with electrical, mechanical, and handshaking procedures over the interface connecting a device to the transmission medium.
Policing	A method for verifying that the incoming VC complies with the user's service contract.
Port	The physical interface to a computer or multiplexer, for connection of terminals and modems.
Prioritization	Also called CoS (class of service), classifies traffic into categories such as high, medium, and low. The lower the priority, the more "drop eligible" is a packet. When the network gets busy, prioritization ensures critical or high-rated traffic is passed first, and packets from the lowest categories may be dropped.
Protocol	A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.

RADIUS (Remote Authentication Dial-In User Service)	An authentication, authorization and accounting protocol for applications such as network access or IP mobility. Many network services require the presentation of security credentials (such as a username and password or security certificate) in order to connect to the network. Before access to the network is granted, this information is passed to a network access server (NAS) device over the link-layer protocol, then to a RADIUS server over the RADIUS protocol. The RADIUS server checks that the information is correct using authentication schemes like PAP, CHAP or EAP.
Routing	The process of selecting the most efficient circuit path for a message.
Serial Transmission	A common mode of transmission, where the character bits are sent sequentially one at a time instead of in parallel.
Single Mode	Describing an optical wave-guide or fiber that is designed to propagate light of only a single wavelength (typically 5-10 microns in diameter).
Space	In telecommunications, the absence of a signal. Equivalent to a binary 0.
Sync	See **Synchronous Transmission**.
Synchronous Transmission	Transmission in which data bits are sent at a fixed rate, with the transmitter and receiver synchronized.
T1	A digital transmission link with a capacity of 1.544 Mbps used in North America. Typically channelized into 24 DS0s, each capable of carrying a single voice conversation or data stream. Uses two pairs of twisted pair wires.
Telnet	The virtual terminal protocol in the Internet suite of protocols. It lets users on one host access another host and work as terminal users of that remote host. Instead of dialing into the computer, the user connects to it over the Internet using Telnet. When issuing a Telnet session, it connects to the Telnet host and logs in. The connection enables the user to work with the remote machine as though a terminal was connected to it.

Quick Start Guide

Installation of RICi-622GE should be carried out only by an experienced technician. If you are familiar with RICi-622GE, use this guide to prepare the units for operation.

1. Installing RICi-622GE

Connecting the Interfaces

1. Connect the SDH/SONET equipment to the fiber optic front panel connectors.
2. Connect the 1000BaseT or 1000BaseSx/Lx / 100BaseSx/Lx LAN to the ETH front panel connectors.
3. Use a cross cable to connect the control terminal to the front panel CONTROL connector.

   or

   Connect a Telnet host, a PC running a Web browsing application, or an SNMP management station to the ETH MNG port.

Connecting the Power

Connect the power cable to the power connector on the RICi-622GE.

The unit has no power switch. Operation starts when power is applied to the power connector.

2. Configuring RICi-622GE

Configure RICi-622GE to the desired operation mode via an ASCII terminal connected to the front panel CONTROL port. Alternatively, you can manage RICi-622GE over Telnet, a PC running a Web browsing application, or an SNMP-based management system.

Starting a Terminal Session for the First Time

➤ To start a terminal configuration session:

1. Connect an ASCII terminal to RICi-622GE CONTROL port (default settings are: 115,200; N; 8; 1; Flow control: None).
2. Set the terminal emulator to VT100 emulation for optimal view of system menus.
3. If you are using HyperTerminal, set the terminal mode to 132-column mode for optimal view of system menus (Properties›Settings›Terminal Setup ›132 column mode).

4. Power up RICi-622GE. Verify that the POWER LED in back panel is On.
5. Wait until the RDY indicator is ON, and then press ‹Enter› once to obtain the login screen.
6. Enter your user name and password and proceed with the management session.

Note *The RICi-622GE default user name is **su**, default password is **1234**.*

Configuring RICi-622GE via the Quick Setup Menu

The management software provides a Quick Setup menu that includes the basic parameters necessary for configuration.

➤ To configure RICi-622GE:

1. From the Main Menu, select Main › Configuration › Quick Setup.
2. Configure the parameters according to the table below.

```
                          RICi-622GE
Configuration > Quick Setup
 1. IP address                        ... (-)
 2. IP mask                           ... (-)
 3. Default Gateway                   ... (-)
 4. Host Tagging                    >    (Yes)
 5. Host VLAN ID [1-4094]    ... (1)
 6. Host Priority Tag [0-7]  ... (0)
>

ESC-prev. menu; !-main menu; &-exit;                  1 M/ 2 C
```

```
                          RICi-622GE
Configuration > Quick Setup
 1. IP address                        ... (-)
 2. IP mask                           ... (-)
 3. Default Gateway                   ... (-)
 4. Host Tagging                    >    (No)
 5. SP Management VLAN ID [1-4094]    ... (1)
 6. SP Management Priority Tag [0-7]  ... (0)
>

ESC-prev. menu; !-main menu; &-exit;                  1 M/ 2 C
```

Parameter	Description	Possible Values
IP Address	Host IP address	0.0.0.0 to 255.255.255.255
IP Mask	Host IP mask	0.0.0.0 to 255.255.255.255
Default Gateway	Default gateway IP address	0.0.0.0 to 255.255.255.255
Host Tagging	Specifies if the Management station is using tagged or untagged frames.	**Yes** **No**
Host VLAN ID	Set the VID of the packets sent by host, if host tagging is Yes	1-4094
Host Priority Tag	Set VLAN priority for packets sent by host, if host tagging is Yes	0-7
SP Management VLAN ID	Set the VID for management traffic towards the SP network, if host tagging is No	1-4094
SP Management Priority Tag	Set VLAN priority for management traffic towards the SP network, if host tagging is No	0-7

Contents

Chapter 1
Introduction

1.1 Overview

RICi-622GE is a network termination unit (NTU) that provides simple, efficient, and cost effective Gigabit Ethernet connectivity over SDH/SONET networks. The device can aggregate traffic from up to eight remote SDH/SONET sites. The unit offers a migration path for connecting future-ready IP devices to the existing SDH/SONET networks at up to 1.2 Gbps access rates. RICi-622GE enables cost-effective deployment of the SDH/SONET infrastructure for Internet access and LAN connectivity, while providing continued support for all legacy services.

The unit delivers carrier-grade Ethernet services as defined by the MEF:

- EPL (Ethernet Private Line)
- EVPL (Ethernet Virtual Private Line).

RICi-622GE has two Gigabit Ethernet ports and two STM-4/OC-12 ports that support SFP-based fiber optic connectors. The Ethernet ports can also be ordered with 10/100/1000BaseT interfaces. The STM-4/OC-12 ports offer either 622 Mbps with link bonding using VCAT (G.707/Y.1322) and LCAS (G.7042), or 1+1 link protection (unidirectional MSP/APS) to increase service uptime. The Gigabit Ethernet ports offer redundancy based on link aggregation (802.3ad).

The unit supports powerful bandwidth profiles including CIR/CBS and EIR/EBS for differentiated Ethernet services. RICi-622GE supports encapsulation using GFP per ITU-T Rec. G.7041 or LAPS per ITU-T Rec. X.86, providing efficient bandwidth utilization.

RICi-622GE can be managed via a local terminal port, via a dedicated out-of-band Ethernet port, or inband through a user or network port. The device supports Network Time Protocol and can obtain the time of day from a standard SNTP server. RICi-622GE has two redundant power supplies, increasing its reliability.

Product Options

Gigabit Ethernet Ports

The two Gigabit Ethernet ports are available with the following interfaces:

- 1000BaseSx, LC connector (SFP)
- 1000BaseLx10, LC connector (SFP)
- 10/100/1000BaseT, RJ-45 connector.

The fiber optic interfaces support industry-standard Gigabit SFP hot-swappable optical transceivers. The two ports must be either both fiber optic interface or

both electrical interface. If they have fiber optic interface, the types can be mixed.

STM-4/OC-12 Ports

The STM-4/OC-12 ports are available with the following SFP-based fiber optic interfaces, in any combination:

- 1000BaseSx, LC connector (SFP)
- 1000BaseLx10, LC connector (SFP).

Applications

The application shown in *Figure 1-1* illustrates point-to-point Ethernet private line over SDH/SONET.

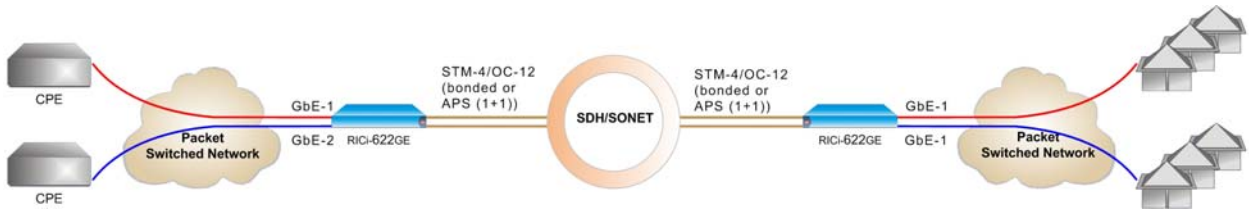


Figure 1-1. Point-to-Point Connection with Ethernet Flows over SDH/SONET

In the application shown in *Figure 1-2*, RICi-622GE aggregates traffic from multiple RICi-155GE units to provide Inter-PoP connectivity and high-bandwidth private line services.

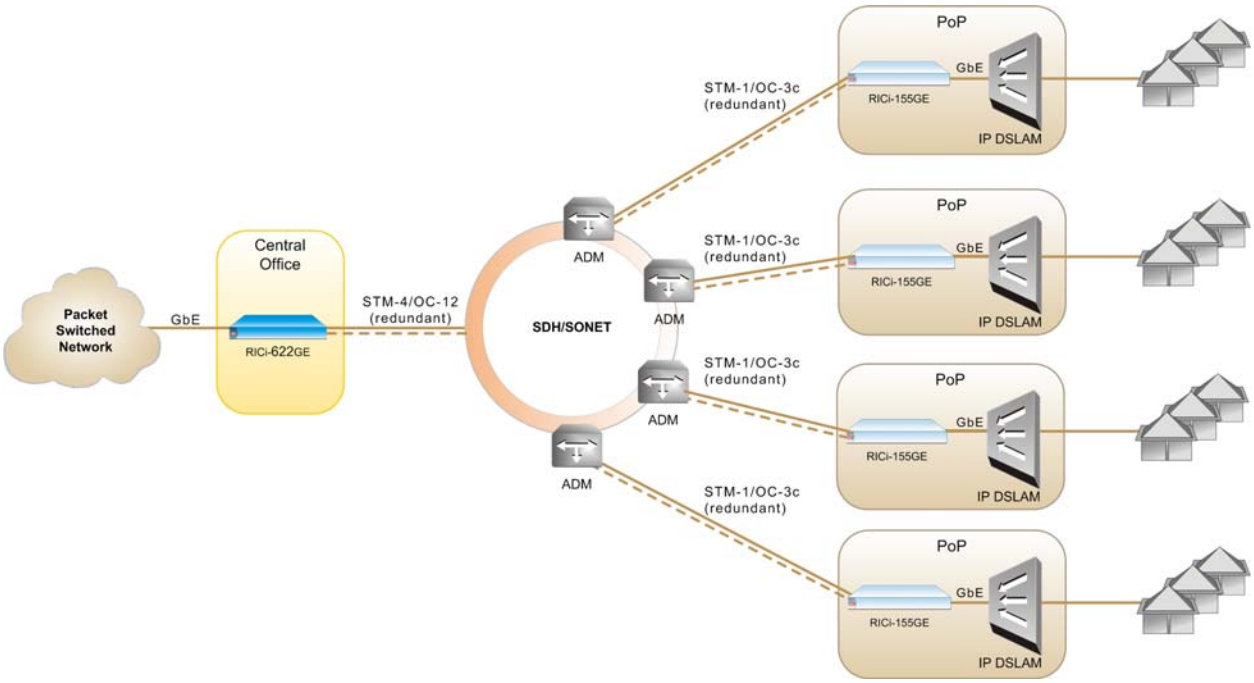


Figure 1-2. Inter-PoP connectivity

Features

Ethernet Link Redundancy

The Gigabit Ethernet ports can act as bridge ports or be aggregated to provide Gigabit Ethernet link redundancy, to allow reliable and uninterrupted service. The RICi-622GE unit supports Gigabit Ethernet link redundancy based on the link aggregation protocol IEEE 802.3ad.

SDH/SONET APS Support

RICi-622GE supports 1+1 link protection (unidirectional MSP/APS) on the SDH/SONET links, according to the ITU-T G.841 requirements. K1/K2 byte functionality is provided according to Telecordia GR-253 and ITU-T G.783. Additional protection is provided by the VCAT and LCAS protocols.

SDH/SONET Timing

You can define a master clock source, and a fallback source to be used if the master clock source fails. The SDH/SONET clock source can be one of the following:

- Internal – Reference source generated by the RICi-622GE internal oscillator
- Rx clock – Reference source locked to the receive clock recovered from the line signal of the STM-1/OC-3c interface.

EVC Mapping

The ingress user traffic is mapped to the Ethernet flows (EVCs) using the following per-port criteria:

- Port-based (All-to-one bundling)
- User port + CE-VID
- User port + CE-VLAN priority.

RICi-622GE supports up to 16 Ethernet flows.

Policing and Bandwidth Profiles

RICi-622GE provides per-flow dual token bucket policing that enables CIR/CBS and EIR/EBS.

Traffic Prioritization and Quality of Service

Once traffic is classified to EVC or EVC.CoS, it is mapped to one four priority queues. The unit uses WRED (tail-drop) policy to ensure that queues are not congested and high-priority traffic is not dropped.

Encapsulation

The Ethernet traffic is encapsulated for transmission over SDH/SONET network using one of the following link layer protocols:

- Link Access Procedure for SDH/SONET (LAPS) protocols in accordance with ITU-T Rec. X.86 draft recommendations
- Generic Framing Procedure (GFP) in accordance with ITU-T Rec. G.7041, ANSI T1-105.02, framed mode.

The traffic encapsulation type is user-configurable.

Loop Detection

RICi-622GE features a mechanism to detect Ethernet loops in the Ethernet interface and SDH network, and avoid them by disabling the bridge port.

The loop detection mechanism is based on periodic transmission of Ethernet loop detection frames with source and destination address equal to the MAC address of the originating RICi-622GE device, so they do not propagate in the network beyond the opposite Ethernet bridge port.

When the loop detection mechanism is active, loop detection frames are sent once every five seconds. If a loop detection frame is received back at the sending port three times within 20 seconds, a loop is declared, the LOOP DETECTED trap is sent, and the bridge port is disabled for four minutes. At the end of the four minutes, the bridge port is restored to service and loop detection frames are again transmitted.

Fault Propagation

The unit provides user-configurable bidirectional fault propagation. SDH/SONET alarms can optionally propagate and cause the Gigabit Ethernet link to shut down. Gigabit Ethernet alarms can also be propagated over the SDH/SONET link

Management

Setup, monitoring, and diagnostics can be performed using one of the following methods:

- Out-of-band via ASCII terminal connected to the V.24/RS-232 DCE control port
- Network management using Telnet, terminal Web-based application, or an SNMP-based management system:
  - Inband management via user or network port
  - Out-of-band management via the dedicated 10/100BaseT management port.

ConfiguRAD

ConfiguRAD is a user-friendly Web-based terminal management system that provides remote device configuration and maintenance. It is embedded into RICi-622GE and provided at no extra cost. ConfiguRAD can be run from any standard Web browser.

Inband Management

For inband management, you can configure the RICi-622GE host for tagged or untagged operation:

- When host tagging is enabled, the host packets receive a VLAN tag, creating a dedicated management VLAN.
- When tagging is disabled, no traffic separation is performed, and management packets can be forwarded to the user port.

Security

The following security protocols are provided by RICi-622GE to ensure client-server communication privacy and correct user authentication:

- RADIUS (client authentication only)
- SSLv3 for Web-based management application
- SSHv2 for Secure Shell communication session
- SNMPv3 (SNMPv1 is used if SNMPv3 is not enabled).

Diagnostics

Loopbacks can be closed on any of the SDH/SONET ports. Only one loopback can be active at a time. When the loopback is active, data coming from the SDH/SONET network is looped back to the SDH/SONET network, disrupting the traffic.

Statistics

RICi-622GE collects performance statistics for the physical layers of the Gigabit Ethernet ports and SDH/SONET ports, as well as for Ethernet flows and VCGs.

1.2 Physical Description

Figure 1-3 shows a 3D view of the front and back of RICi-622GE, with SFP interfaces for the Gigabit Ethernet ports and SDH/SONET ports.

Figure 1-3. RICi-622GE, 3D View

The LEDs, interface connectors, and power connectors are located on the rear panel. Some LEDs are also located on the front panel. The RICi-622GE interface connections are described in greater detail in *Chapter 2*. For a detailed description of the LEDs, see *Chapter 3*.

1.3 Functional Description

Traffic Flow

Figure 1-4 illustrates the traffic handling process. *Table 1-1* provides an overview of the traffic handling stages.

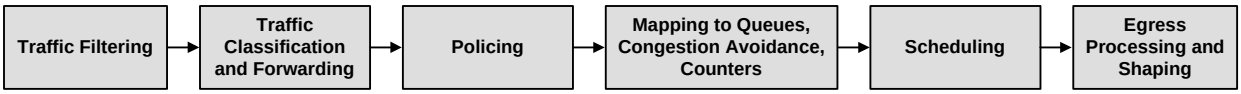


Figure 1-4. Traffic Handling Diagram

Table 1-1. Traffic Handling Stages

Processing Stage	Description
Traffic filtering	Performing MAC filtering (ACL), CE-VLAN filtering, MAC limitation
Traffic classification	Creating EVC or EVC.CoS accrding to CE-VLAN, P-bit
2R3C policing	Applying CIR+CBS,EIR+EBS per EVC/EVC.cos
Mapping to queues, congestion avoidance, counters	Mapping EVC/EVC.CoS to 5 queues (1 SPQ + 4 WFQ)
	Applying congestion avoidance techniques
	Activating counters per EVC/EVC.CoS
Scheduling	Dequeuing traffic from SPQs and WFQs
Egress processing, egress shaping	Priority (S-Tag) marking
	Egress port shaping

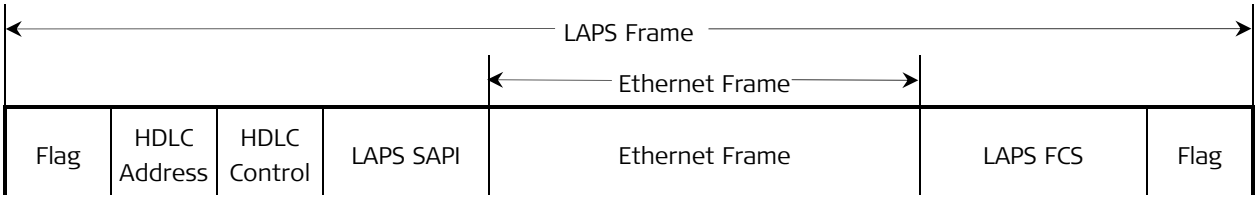
Encapsulation

RICi-622GE supports the following encapsulation protocols:

- Link Access Protocol (LAPS) for SDH/SONET in accordance with ITU-T Rec. X.86 draft recommendations
- Generic Framing Procedure (GFP) in accordance with ITU-T Rec. G.7041, ANSI T1-105.02, framed mode.

LAPS Encapsulation

With LAPS, each Ethernet frame is encapsulated in the frame structure shown in *Figure 1-5*. The LAPS frame is delineated by flags, followed by HDLC information (address and control), and by a LAPS service access point identifier (SAPI). The Ethernet frame is followed by a LAPS frame checksum (FCS), for error detection.



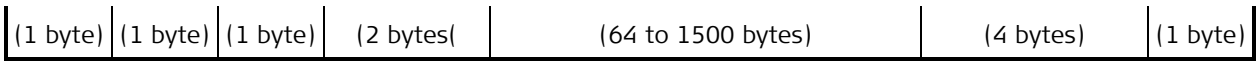


Figure 1-5. LAPS Encapsulation Format

GFP Encapsulation

The GFP encapsulation method uses the basic frame structure shown in *Figure 1-6*.

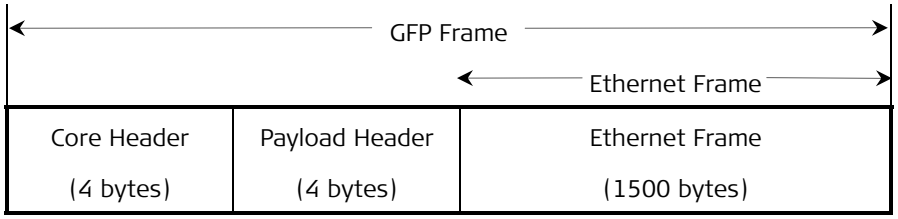


Figure 1-6. Basic GFP Encapsulation Format

Figure 1-7 shows the detailed structure of a basic GFP frame. The frame includes the following fields:

- **PLI** – Payload length indicator
- **cHEC** – Core header CRC (calculated using ITU-T CRC-16 polynomial)
- **Payload Area** – Carries a framed PDU
- **Payload Header** – Header used for client PDU management
- **pFCS** – Optional payload FCS (calculated using ITU-T CRC-32 polynomial).

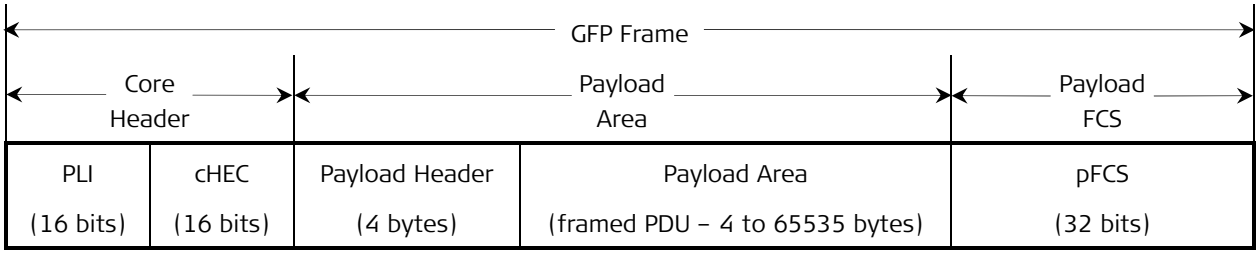


Figure 1-7. Detailed Structure of Basic GFP Frame

All GFP OAM&P functions are handled by the GFP core header.

The payload header supports the payload-specific adaptation functions, which depend on the client application (for RICi-622GE, the client application is Ethernet). The payload header also supports multiplexing (using extension headers), and any application-dependent link management functions (using dedicated client management frames)

Protection against errors (on a per frame basis) is provided by the optional payload frame checksum (FCS) field.

Idle frames are used for asynchronous rate adaptation.

Fault Propagation

Gigabit Ethernet link failure can be propagated over the SDH/SONET link on failure of one or both links. Also, SDH/SONET link failure can be propagated over the Gigabit Ethernet link. The user can configure the behavior of the fault propagation mechanism per Gigabit Ethernet link or SDH/SONET link. *Figure 1-8* and *Figure 1-9* illustrate the fault propagation mechanism.

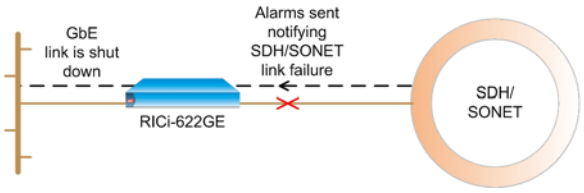


Figure 1-8. SDH/SONET to Gigabit Ethernet Fault Propagation

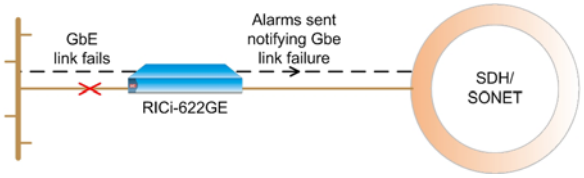


Figure 1-9. SDH/SONET to Gigabit Ethernet Fault Propagation

1.4 Technical Specifications

Gigabit Ethernet Interface	*Number of Ports*	2 (RJ-45 or fiber optic SFPs)
	Fiber Optic Specifications and Ranges	See SFP Transceivers data sheet for specifications
	Electrical Operation Mode	10/100/1000BaseT, full or half duplex, autonegotiation
	Connector	Fiber optic: LC 1000BaseT: RJ-45
STM-4/OC-12 Interface	*Number of Ports*	2 (fiber optic SFPs)
	Fiber Optic Specifications and Ranges	See SFP Transceivers data sheet for specifications
	Connector	LC

10/100BaseT Management Port	*Compatibility*	IEEE 802.3
	Operation	Full duplex, autonegotiation
	Frame Size	Up to 1500 bytes
	Connector	RJ-45
Control Port	*Interface*	RS-232/V.24 (DCE asynchronous)
	Data Rate	9.6, 19.2, 115.2 kbps
	Connector	DB-9, female
Standard Compliance	*IEEE*	802.3, 802.3u, 802.1Q, 802.1p
	MEF	MEF 9 (EPL, EVPL), MEF 14 (EPL, EVPL)
Ethernet Flows (EVCs)	*Number of Flows*	16
	Number of Services (EVC or EVC.CoS)	8
Management	*Out-of-Band*	Via dedicated control port Via dedicated 10/100BaseT management port
	Inband	Via user or network port
Indicators	*POWER (green)*	On: RICi-622GE is powered on Off: RICi-622GE is off
	RDY (green)	On: RICi-622GE has completed its startup and is ready for operation
	TST (yellow)	On: Test is running such as loopback Off: No test is running
	MAJOR ALM (red)	On: Major alarm condition is present Off: No major alarm condition is present
	MINOR ALM (red)	On: Minor alarm condition is present Off: No minor alarm condition is present
	GbE LINK (per port) (green)	On: Ethernet link is connected Off: Ethernet link is disconnected

	GbE ACT (per port) (yellow)	Blinking: Ethernet frame received or sent within the last second Off: No frame received or sent within the last second
	MNG LINK (green)	On: Ethernet link is connected Off: Ethernet link is disconnected
	MNG ACT (yellow)	Blinking: Ethernet frame received or sent within the last second Off: No frame received or sent within the last second
	SDH/SONET ON LINE (per port) (green)	On: STM-4/OC-12 link is connected Blinking: STM-4/OC-12 link is in standby status Off: STM-4/OC-12 link is not connected
	SDH/SONET LOS (per port) (red)	On: Loss of signal on STM-4/OC-12 link
Power	*AC Source*	100 to 240 VAC (±10%), 50/60 Hz
	DC Source	–48 VDC (–40 to –72 VDC)
	Power Consumption	AC: 40W DC: 38W
Physical	**Regular unit:**	
	Height	43.7 mm (1.7 in) (1U)
	Width	440 mm (17.3 in)
	Depth	240 mm (9.4 in)
	Weight	4 kg (8.8 lb)
	NEBS-compliant unit:	
	Height	43.7 mm (1.7 in) (1U)
	Width	541 mm (21.3 in)
	Depth	240 mm (9.4 in)
	Weight	4.9 kg (10.8 lb)
Environment	*Temperature*	
	Regular unit:	0–50°C (32–122°F)
	NEBS-compliant unit:	0–55°C (32–131°F)

Humidity	Up to 90%, non-condensing

Chapter 2

Installation and Setup

This chapter describes installation and setup procedures for the RICi-622GE unit.

After installing the unit, refer to *Chapter 3* for operating instructions.

If a problem is encountered, refer to *Chapter 6* for test and diagnostic instructions.

Warning

Internal settings, adjustment, maintenance, or repairs must be performed only by a skilled technician who is aware of the hazards involved.

Always observe standard safety precautions during installation, operation, and maintenance of this product.

Warning

For your protection and to prevent possible damage if a fault condition such as a lightning strike or contact with high voltage power lines occurs on the cables connected to the equipment, RICi-622GE must be properly grounded at all times. Any interruption of the protective (grounding) connection inside or outside the equipment, or disconnection of the protective ground terminal, can make this equipment dangerous. Intentional interruption is prohibited.

2.1 Site Requirements and Prerequisites

RICi-622GE is intended for installation as a desktop unit, mounted on the wall, or mounted in a 19-inch rack or 23-inch rack. The following mounting kits are available from RAD:

- RM-34 for mounting one 19-inch RICi-622GE unit in a 19-inch rack
- RM-34-23 for mounting one 23-inch RICi-622GE unit in a 23-inch rack
- WM-34 for mounting one 19-inch RICi-622GE unit on the wall.

AC-powered RICi-622GE units should be installed within 1.5 meters (5 feet) of an easily accessible grounded AC outlet capable of furnishing the required supply voltage, in the range of 100 to 240 VAC, 50/60 Hz.

DC-powered RICi-622GE units require a -48 VDC power source, which must be adequately isolated from the main supply.

Note

Refer also to the sections describing connections of AC and DC mains at the beginning of the manual.

Allow at least 90 cm (36 in) of frontal clearance for operator access. For continuous product operation allow at least 10 cm of frontal clearance and at

least 15 cm at rear of the unit, for cable connections and ventilation. For proper ventilation, keep at least 4 cm clearance from the sides and top of the product.

The ambient operating temperature of RICi-622GE is 0° to 55° C (32° to 131°F), at a relative humidity of up to 90%, non-condensing.

Warning

Do not cover fan and ventilation openings.

2.2 Package Contents

RICi-622GE package contains the following items:

- RICi-622GE unit
- SFP modules (if ordered)
- Two AC power cords (for AC option)
- Two DC connection kits (for DC option)
- CBL-DB9F-DB9M-STR straight cable for ASCII terminal connection (if ordered)
- RM-34 (if ordered) for mounting one 19-inch RICi-622GE unit in a 19-inch rack
- RM-34-23 (if ordered) for mounting one 23-inch RICi-622GE unit in a 23-inch rack
- WM-34 (if ordered) for mounting one 19-inch RICi-622GE unit on the wall.

2.3 Required Equipment

RICi-622GE requires no special tools for installation. You need a screwdriver to mount RICi-622GE in a 19-inch or 23-inch rack. You need a screwdriver and drill to mount RICi-622GE on the wall.

2.4 Mounting the Unit

RICi-622GE is designed for installation as a desktop unit or mounted in a rack.

- For rack-mounting instructions, refer to the installation kit manual.
- If RICi-622GE is to be used as a desktop unit, place and secure the unit on a stable, non-movable surface.

Refer to the clearance and temperature requirements in *Site Requirements and Prerequisites.*

2.5 Installing Fiber Optic SFP Modules

RICi-622GE uses SFP modules with LC fiber optic connectors that provide hot-swappable industry-standard interfaces.

Warning

Third-party SFP optical transceivers must be agency-approved, complying with the local laser safety regulations for Class 1 laser equipment.

➤ **To install fiber optic SFP module:**

1. Lock the wire latch of each SFP module by lifting it up until it clicks into place, as illustrated in *Figure* 2-1.

Note

Some SFP models have a plastic door instead of a wire latch.

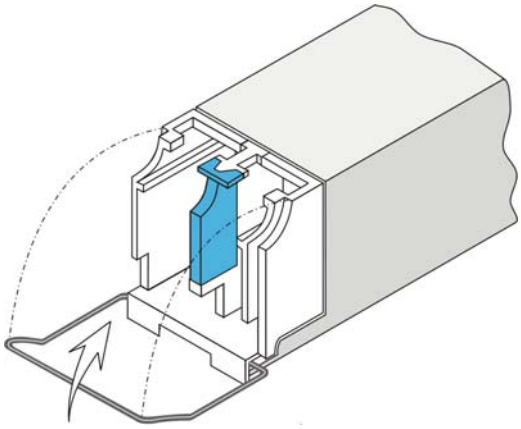


Figure 2-1. Locking the SFP Wire Latch

2. Carefully remove the dust covers from the SFP slot.
3. Insert the rear end of the SFP into the socket, and push slowly backwards to mate the connectors until the SFP clicks into place. If you feel resistance before the connectors are fully mated, retract the SFP using the wire latch as a pulling handle, and then repeat the procedure.
4. Remove the protective rubber caps from the SFP modules.

➤ **To remove SFP module:**

1. Disconnect the fiber optic cables from the SFP module.
2. Unlock the wire latch by lowering it downwards (as opposed to locking).
3. Hold the wire latch and pull the SFP module out of the port.

2.6 Connecting to Gigabit Ethernet Equipment

RICi-622GE includes two Gigabit Ethernet ports.

RICi-622GE is connected to the Gigabit Ethernet equipment via fiber optic SFP or 8-pin RJ-45 electrical port. Refer to *Appendix A* for the RJ-45 connector pinout. The Gigabit Ethernet ports must be either both fiber optic interface or both electrical interface.

➤ **To connect to the Gigabit Ethernet equipment with fiber optic SFP:**

- Connect RICi-622GE to the Gigabit Ethernet network equipment using a standard fiber optic cable terminated with an LC connector. Refer to *Installing Fiber Optic SFP Modules* for details on installing fiber optic SFPs.

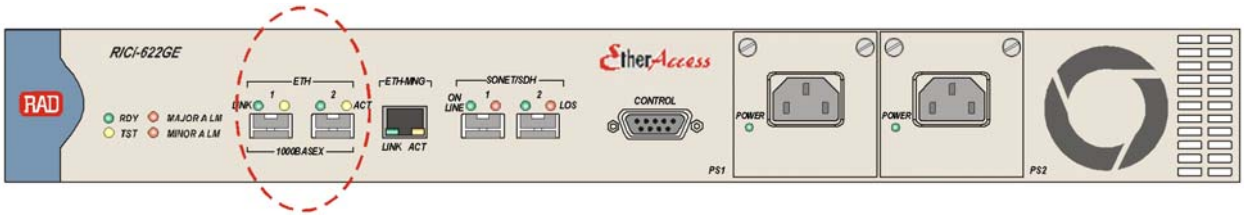


Figure 2-2: Gigabit Ethernet SFP Connectors

➤ **To connect to the Gigabit Ethernet equipment with a copper interface:**

- Connect RICi-622GE to the Gigabit Ethernet network equipment using a standard straight UTP/STP cable terminated with an RJ-45 connector.

Note *When connecting Gigabit Ethernet cables longer than 30 meters (98 feet), it is recommended to use shielded cables.*

Figure 2-3: Gigabit Ethernet 10/100/1000BaseT Electrical Connectors

2.7 Connecting to SDH/SONET Equipment

RICi-622GE is connected to the SDH/SONET equipment via fiber optic SFP interface, with LC connector.

➤ **To connect to the SDH/SONET network equipment :**

- Connect RICi-622GE to the SDH/SONET network equipment using a standard fiber optic cable terminated with an LC connector, as necessary. Refer to *Installing Fiber Optic SFP Modules* for details on installing fiber optic SFPs.

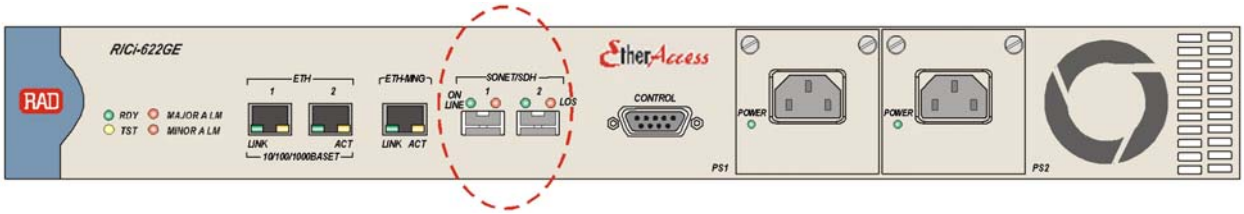


Figure 2-4: SDH/SONET SFP Connectors

2.8 Connecting to Management Stations

RICi-622GE can be connected to a local ASCII terminal via the CONTROL port or to a remote network management station via the dedicated Ethernet management port.

Connecting to an ASCII Terminal

RICi-622GE is connected to an ASCII terminal via a 9-pin D-type female connector designated CONTROL. Refer to *Appendix A* for the connector pinout.

➤ **To connect to an ASCII terminal:**

1. Connect the male 9-pin D-type connector of CBL-DB9F-DB9M-STR straight cable available from RAD to the CONTROL connector.
2. Connect the other connector of the CBL-DB9F-DB9M-STR cable to an ASCII terminal.

Caution Terminal cables must have a frame ground connection. Use ungrounded cables when connecting a supervisory terminal to a DC-powered unit with floating ground. Using improper terminal cable may result in damage to supervisory terminal port.

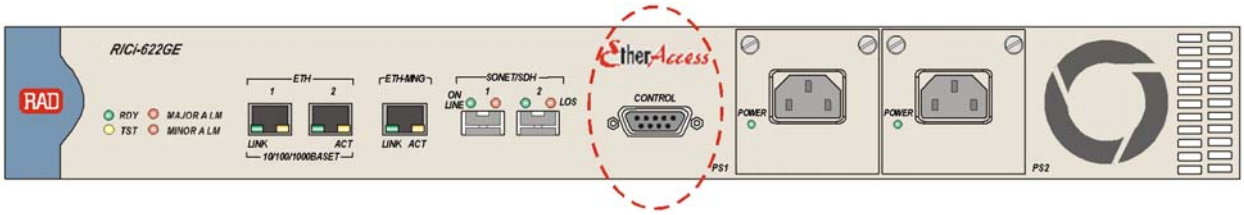


Figure 2-5: CONTROL Connector

Connecting to a Network Management Station

RICi-622GE is connected to an NMS via an 8-pin RJ-45 connector designated ETH MNG. Refer to *Appendix A* for the connector pinout.

➤ **To connect to an NMS:**

- Connect RICi-622GE to a hub or switch using a straight cable

  or

- Connect RICi-622GE to a network interface card using a cross cable.

Note

When connecting Fast Ethernet cables longer than 30 meters (98 feet), it is recommended to use shielded cables.

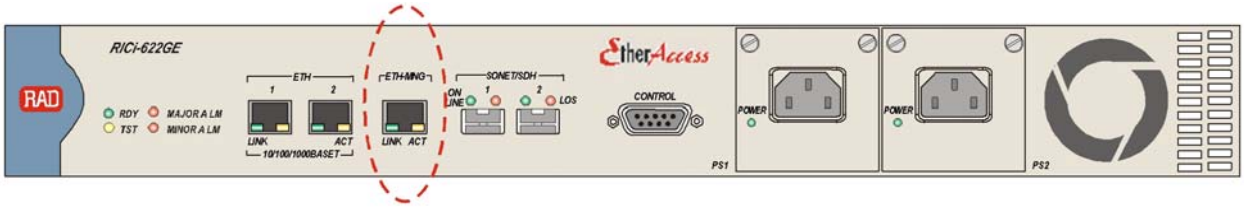


Figure 2-6: Fast Ethernet Management Connector

2.9 Connecting to Power

Warning

Before connecting or disconnecting any communication cable, the unit must be grounded by connecting its power cord to a power outlet with a ground terminal, and by connecting the ground terminal on the panel (if provided) to a protective ground.

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting of the protective ground terminal can make this unit dangerous. Intentional interruption is prohibited.

Warning

RICi-622GE is equipped with a laser diode.

Please observe the following precautions:

- Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter.
- Do not look into a laser connector when the power is turned on, a laser can cause eye damage.
- Do not use broken or unterminated fiber-optic cables/connectors.

ATTENTION: The laser beam may be invisible!

Warning

The unit cannot be connected simultaneously to both AC and DC outlets.

Connecting to AC Power

AC power is supplied to RICi-622GE via 1.5m (5 ft) standard power cable terminated by standard 3-prong plug. The cable is provided with the unit.

➤ To connect AC power:

1. Verify that the AC outlet is grounded properly. Ensure that the supply voltage is in the range 100 VAC to 240 VAC.

2. Connect the power cable to the power connectors on RICi-622GE first and then to the AC mains outlet.

Connecting to DC Power

DC-powered RICi-622GE units have one or two terminal block DC inlets. The -48 VDC power is supplied via connection kits delivered with the unit.

➤ To connect DC power:

- Refer to the DC power supply connection supplement for instructions how to wire the DC adapter. The DC supplement is provided at the end of this manual.

Chapter 3

Operation

This chapter:

- Explains power-on and power-off procedures
- Provides a detailed description of the front panel indicators and their functions
- Lists methods of RICi-622GE configuration, including working with ASCII terminal and Web browser management applications
- Illustrates the menu map.

For a detailed explanation of menu parameters, see *Chapter 4*.

3.1 Turning On the Unit

➤ To power up RICi-622GE:

- Connect the power cord to the mains.

  The POWER indicator lights up and remains lit as long as RICi-622GE receives power. When the unit has completed its startup procedure and is ready for operation, the RDY indicator lights up.

RICi-622GE requires no operator attention once installed, with the exception of occasional monitoring of front panel indicators. Intervention is only required when RICi-622GE must be configured to its operational requirements, or diagnostic tests are performed.

3.2 Indicators

The unit's LEDs are located on the front panel and rear panel (see *Figure 3-1* and *Figure 3-2*). The functions of the RICi-622GE LED indicators are listed in *Table 3-1*.

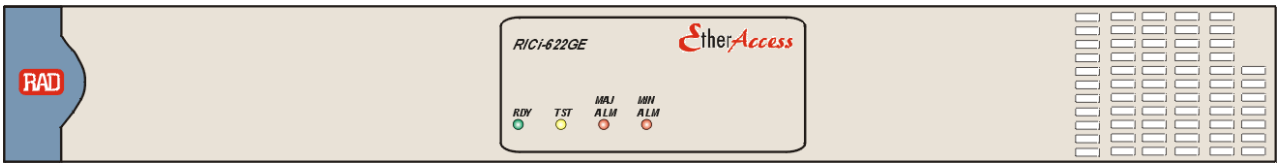


Figure 3-1. RICi-622GE Front Panel

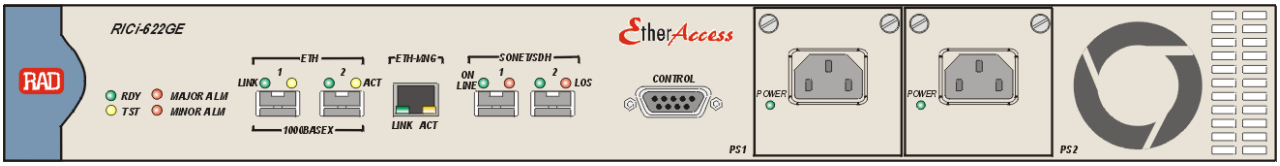


Figure 3-2. RICi-622GE Back Panel

Table 3-1. RICi-622GE LEDs

Name	LED Color	Function
POWER	Green	On: RICi-622GE is powered on Off: RICi-622GE is off
RDY	Green	On: RICi-622GE has completed its startup and is ready for operation Off: RICi-622GE has not completed its startup or RICi-622GE is off
TST	Yellow	On: Test is running such as loopback Off: No test is running
MAJOR ALM	Red	On: Major alarm condition is present Off: No major alarm condition is present
MINOR ALM	Red	On: Minor alarm condition is present Off: No minor alarm condition is present
GbE LINK 1,2	Green	On: Corresponding Ethernet link is connected Off: Corresponding Ethernet link is disconnected
GbE ACT 1,2	Yellow	Blinking: Ethernet frame received or sent on corresponding link within the last second Off: No frame received or sent on corresponding link within the last second
MNG LINK	Green	On: Ethernet link is connected Off: Ethernet link is disconnected
MNG ACT	Yellow	Blinking: Ethernet frame received or sent within the last second Off: No frame received or sent within the last second
SDH/SONET ON LINE 1,2	Green	On: Corresponding STM-4/OC-12 link is connected Blinking: Corresponding STM-4/OC-12 link is in standby status Off: Corresponding STM-4/OC-12 link is not connected
SDH/SONET LOS 1,2	Red	On: Loss of signal on corresponding STM-4/OC-12 link

3.3 Default Settings

Table 3-2 lists the default settings of the RICi-622GE configuration parameters.

Table 3-2. RICi-622GE Default Settings

Type	Parameter	Default Value
System		
Host	IP Address	0.0.0.0

Type	Parameter	Default Value
	IP Mask	0.0.0.0
	Default Gateway	0.0.0.0
Encapsulation	Host Tagging	No
	Host VLAN ID	0
	Host VLAN Priority	0
Management Access	SNMP Access	Enable
	Telnet/SSH Access	Enable
	Web Access	Enable
User Access	User Name	None
	Permission	None
RADIUS Parameters	Server Access	Disable
	Server IP Address	0.0.0.0
	Key String	Empty
	Number of Retries	2
	Timeout (in seconds)	2
	Authentication Port	1812
SNMP	Trap Community	public
	Write Community	private
	Read Community	public
SNMPv3	SNMPv3	Disable
SNMPv3 Settings	Authentication Protocol	usmNoAuthProtocol
	Privacy Protocol	usmNoPrivProtocol
	Message Processing Model	SNMPv3
	Security Model	Any
	Security Level	noAuthNoPriv
Control Port	Baud rate	115,200
	Data bits	8
	Parity	None
	Stop bits	1
Physical Layer		
Ethernet	Administrative Status	Up
	Autonegotiation	Enable
	Max Capability Advertised/ Speed & Duplex	SFP installed: 1000BaseX full duplex RJ-45: 1000BaseT full duplex

Type	Parameter	Default Value
SDH/SONET	Administrative Status	Up
	Block Rx Payload on TIM	Disable
Logical Layer		
VCG-1	Administrative status	Up
	VC Type	SDH : VC-4 SONET: STS-3C
	LCAS	No
	Number of VCs	4
	Encapsulation	GFP
	VCAT	Yes
	FCS	Yes
	Payload Scrambling	Yes
VCG-2 through VCG-8	Administrative status	Down
	VC Type	Not defined
	LCAS	Not defined
	Number of VCs	Not defined
	Encapsulation	GFP
	VCAT	Yes
	FCS	Yes
	Payload Scrambling	Yes
Application		
Bridge Port (ETH-1)	Usage	User
	Accept Frame Type	All
	Flow Classification Mode	All-to-One
	CoS Profile	DefaultCosPbits1
	Default VID	1
	Default 802.1p	0
	Ingress MTU	2048
	Loop detection	Disable
	Egress Bandwidth Profile	Default bandwidth profile index (1)
	Egress Rate Limit	1,000,000
	Egress Burst Size	2048
Bridge Port (ETH-2)	Usage	User
	Accept Frame Type	All

Type	Parameter	Default Value
	Flow Classification Mode	Flow-Based
	CoS Profile	DefaultCosPbits1
	Default VID	1
	Default 802.1p	0
	Ingress MTU	2048
	Loop detection	Disable
	Egress Bandwidth Profile	Default bandwidth profile index (1)
	Egress Rate Limit	1,000,000
	Egress Burst Size	2048
Bridge Port (VCG-1)	Usage	Network
	Accept Frame Type	All
	Flow Classification Mode	Flow-Based
	CoS Profile	DefaultCosPbits1
	Default VID	1
	Default 802.1p	0
	SP Tag Protocol Identifier	8100
	Ingress MTU	2048
	Marking Profile	Marking1
	Loop detection	Disable
	Egress Bandwidth Profile	Default bandwidth profile index (1)
	Egress Rate Limit	1,000,000
	Egress Burst Size	2048
Flows	Flow ID	1
	Flow Name	Put your string here
Bridge Port List	Bridge Port	ETH-1
	Ingress BW Profile	Profile1
	Bridge Port	VCG-1
	SP VLAN	0
QoS		
CoS Profiles	CoS Profile Name	DefaultCoSPbits1
	Tag Value 0	0
	Tag Value 1	0
	Tag Value 2	0

Type	Parameter	Default Value
	Tag Value 3	0
	Tag Value 4	0
	Tag Value 5	0
	Tag Value 6	0
	Tag Value 7	0
Marking Profiles	Profile Name	Marking1
	CoS Value 0	0
	CoS Value 1	0
	CoS Value 2	0
	CoS Value 3	0
	CoS Value 0 for Yellow	0
	CoS Value 1 for Yellow	0
	CoS Value 2 for Yellow	0
	CoS Value 3 for Yellow	0
Bandwidth Profiles	Profile Name	Profile1
	CIR	1000000
	CBS	2048
	EIR	0
	EBS	0
	Policed Traffic	All
	Color Mode	Blind
	Coupling Flag	Disable

3.4 Configuration and Management Alternatives

After installation, there are no special operating procedures for RICi-622GE. Once it is powered up, the unit operates automatically. The unit operational status can be monitored constantly.

If required, RICi-622GE can be reconfigured. RICi-622GE can be managed using the following ports and applications:

- Local out-of-band management via the Fast Ethernet port or via an ASCII terminal connected to the RS-232 port. Usually, preliminary configuration of the system parameters is performed via ASCII terminal. Once the RICi-622GE host IP parameters are set, it is possible to access it via Telnet, ConfiguRAD, or RADview Lite for further configuration.

- Remote inband management via the first user port. Remote management is performed using Telnet, ConfiguRAD (RAD's Web-based application), or an SNMP-based management system).

The RICi-622GE management software supports the following functions:

- Viewing system information
- Modifying configuration parameters and modes of operation, including setting system default values and resetting the unit
- Monitoring RICi-622GE performance
- Initiating connectivity tests
- Uploading and downloading software and configuration files.

Working with Terminal

RICi-622GE has a V.24/RS-232 asynchronous DCE port, designated CONTROL and terminated in a 9-pin D-type female connector. The control port continuously monitors the incoming data stream and immediately responds to any input string received through this port.

The RICi-622GE control port can be configured to communicate at the following rates: 9.6, 19.2, or 115.2 kbps.

➤ **To start a terminal control session:**

1. Make sure all RICi-622GE cables and connectors are properly connected.
2. Connect RICi-622GE to a PC equipped with an ASCII terminal emulation application (for example, Windows Hyper Terminal or Procomm).
3. Turn on the control terminal PC and set its port parameters to: 115,200 baud, 8 bits/character, 1 stop bit, no parity, flow control: none.
4. Set the terminal emulator to ANSI VT100 emulation (for optimal view of system menus).
5. If you are using Hyper Terminal, set the terminal mode to 132 column mode for optimal view of system menus (**Properties->Settings->Terminal Setup->132 column mode**).
6. When the initialization and self-test are over, press any key to display the login screen.

```
                              RICi-622GE
 USER NAME:
 PASSWORD:




ESC – clear; & – exit;                                        0 M/2 C
```

Figure 3-3. Login Screen

Logging In

To prevent unauthorized modification of operating parameters, RICi-622GE supports two access levels:

- **Superuser** can perform all the activities supported by the RICi-622GE management facility, including defining new users.
- **User**'s access rights are defined by the superuser. Users are not allowed to create new users.

Note *It is recommended to change default passwords to prevent unauthorized access to the unit.*

➤ **To enter as a superuser:**

1. Enter **su** for user name.
2. Enter **1234** for password.

This allows you to configure all the parameters of RICi-622GE, and to change the **su** and **user** passwords.

➤ **To enter as a user:**

1. Enter **user** for user name.
2. Enter **1234** for password.

Choosing Options

This section describes how to work with the menus provided by the RICi-622GE management software.

➤ **To select a menu item:**

- Type the corresponding line number and then press **<Enter>**.

  One of the following occurs:

  - A submenu or parameter selection screen is displayed
  - You are enabled to type the (free text) parameter value in the same row
  - You are enabled to toggle the current value of the corresponding parameter (relevant to **ENABLE/DISABLE** or **ON/OFF** selections).

- The response received after selecting a menu item is indicated as follows:

›	Selecting that item displays a submenu or a parameter selection screen.
...	Selecting that item enables you to type the desired value in the same line.
Nothing	When neither symbol is displayed, selecting that item toggles the current selection, now shown in brackets (for example, this changes **ENABLE** to **DISABLE** or vice versa).

Parameter Selection Screen

The current value of a parameter is listed within parentheses ( ).

➤ **To change a parameter value on a parameter selection screen:**

- Type the line number corresponding to the desired value, and then press <**Enter**>.

➤ **To enter a value that requires free text entry**

- Type in the desired string and then press <**Enter**>. Use backspace to erase the current string.

  Note that when applicable, the allowed range of values of a parameter is listed within square brackets **[ ]**.

  The entry is checked after pressing <**Enter**>, and it is accepted only if it is valid:

If you make an error, for example, if you press a key not active on the current screen or select an invalid parameter value, an ERROR indicator appears in the right-hand corner. This indicator disappears as soon as you perform a correct operation.

If you select a parameter value incompatible with the current operating state or other parameters, a message is displayed that explains the error.

Terminal Hot Keys

The available hot keys are listed in the lower part of each screen. The following hot keys are system keys available on menu screens:

- <**Esc**> – Return to previous menu
- <**Tab**> – select the next cell that may be changed
- **A** or **a** – Add item
- **S** or **s** – Save
- **D** or **d** – Delete, for example to delete an item from the Data Base
- **!** – Return to the main menu
- **&** – Exit to password screen (to prevent unauthorized access after completing the session)
- **F** or **f** – Forward interval (statistic menus)
- **B** or **b** – Backward interval (statistic menus).

When a menu is too long to fit on one screen, it is displayed on two consecutive pages. In this case, you see **...(N)** after the last line on the first page and **...(P)** after the last line on the second page.

➤ **To navigate between the pages:**

- While on the first page, press **N** to display the second page
- While on the second page, press **P** to return to the first page.

When a configuration screen is organized as a table, a special set of keys is used for navigation within the table (this type of screen always has a **?** (help) option

that displays these keys). The following keys and shortcuts are available for navigation within tables:

- <Left arrow> – move left
- <Right arrow> – move right
- <^L > – scroll left
- <^R > – scroll right
- ^D – scroll down
- ^U – scroll up
- <Tab> – select next changeable cell
- G followed by <row number>,<col number> – select a specific cell. For example, type G2,5 to select the fifth cell in the second row.

Ending a Terminal Configuration Session

➤ To end the current terminal session:

- Type &.

After a session is ended, you must log in with a valid user name and password to start a new session.

Working with ConfiguRAD

Web Browser Requirements

The following Web browsers can be used to access the RICi-622GE supervision utility from any location that enables access to the RICi-622GE using Internet protocols.

- Internet Explorer 6.0 and up, running on Windows™
- Netscape Communicator 7.0 and up, running on Windows™, HPOV, or Linux
- Firefox 1.0.4 and up, running on Windows™
- Mozilla 1.4.3 and up, running on Linux.

it is necessary to configure RICi-622GE for Web access before it can be accessed with a Web Browser.

When using a Web browser, pay attention to the following points:

- Enable scripts
- Configure the firewall that is probably installed on your PC to allow access to the destination IP address
- Disable pop-up blocking software (such as Google Popup Blocker); you may also have to configure your spyware/adware protection program to accept traffic from/to the destination IP address
- Flush the browser's cache whenever you return to the same screen. This is necessary to prevent configuration errors, because browsers store the last viewed pages in a special cache.

Logging In

➤ To manage RICi-622GE via Web browser:

1. Open the Web browser.
2. Enter the IP address of RICi-622GE in the address field of the browser in the following format: http://'IP address' ('IP address' stands for the actual RICi-622GE IP address).
3. After entering the address, press <Enter> to command the browser to connect.
4. After the opening window is displayed, click LOGIN.
5. In the Password Entry window, log in by entering your user name (*user*) and password (*1234*).

   The Main menu is displayed.
6. Use standard browser operating procedures to perform the desired activities.

Notes

- *It is recommended to change default passwords to prevent unauthorized access to the unit.*
- *If no user input is detected during a ConfiguRAD session for the amount of time defined by the security timeout parameter in the Terminal menu, the RICi-622GE unit automatically disconnects from the management station. After the unit disconnects, the system doesn't react to user input.*

Navigating the ConfiguRAD Menus

ConfiguRAD is Web-based remote access terminal management software. It provides a user-friendly interface for configuring, collecting statistics, and performing diagnostic tests on RICi-622GE.

➤ To choose an option:

1. Click a link in the ConfiguRAD screen to display the next menu.
2. When the target screen is displayed, select a value from the drop-down box or enter it in a text box.

At the left-hand bottom corner, ConfiguRAD provides some auxiliary management tools:

- Status – shows the number of users currently managing RICi-622GE
- Trace – opens an additional pane for system messages, progress indicators (ping, software and configuration file downloads), and alarms. It is recommended to always keep the trace pane open.
- Refresh All – refreshes all ConfiguRAD display elements.

Menu Maps

Use these menu trees as a reference aid while performing configuration and control functions. *Chapter 4* illustrates menus and explains parameters. *Table 3-2* lists default values.

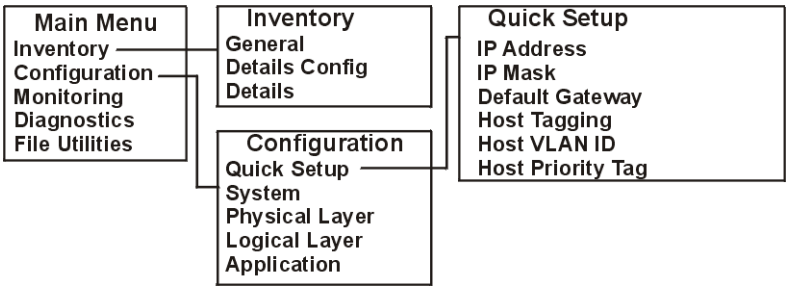


Figure 3-4. Main Menu › Configuration › Quick Setup

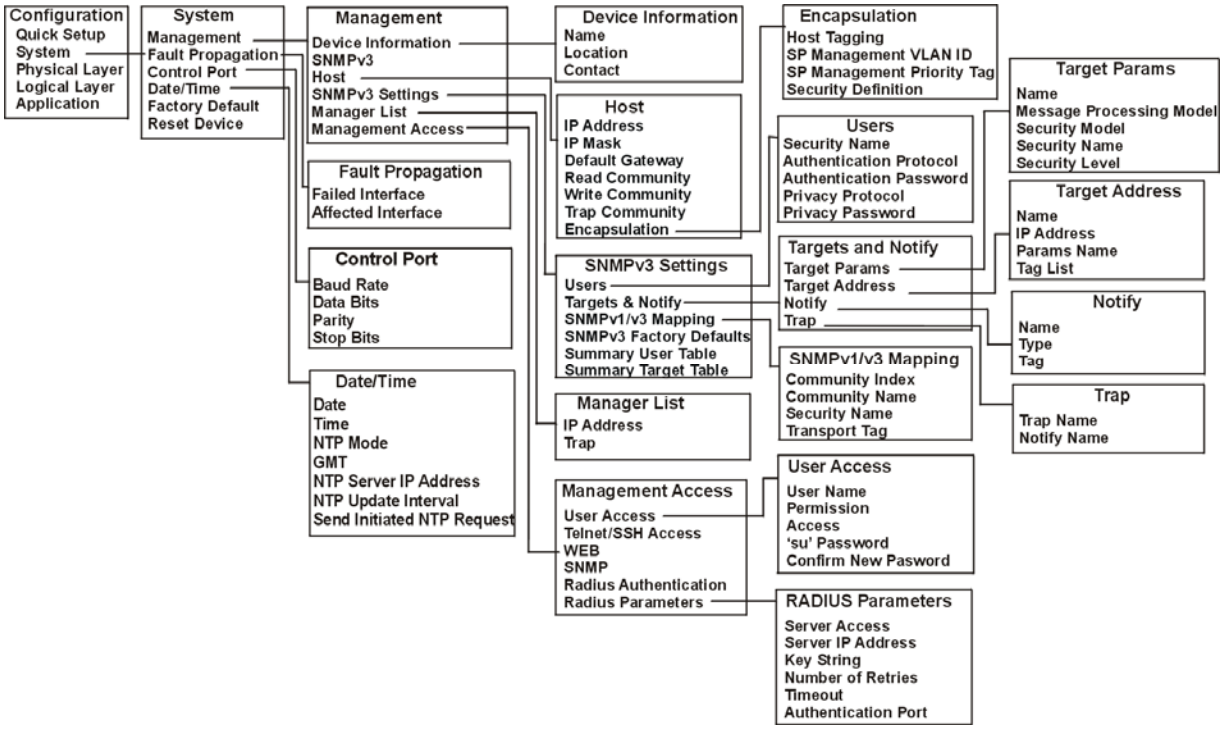


Figure 3-5. Configuration › System

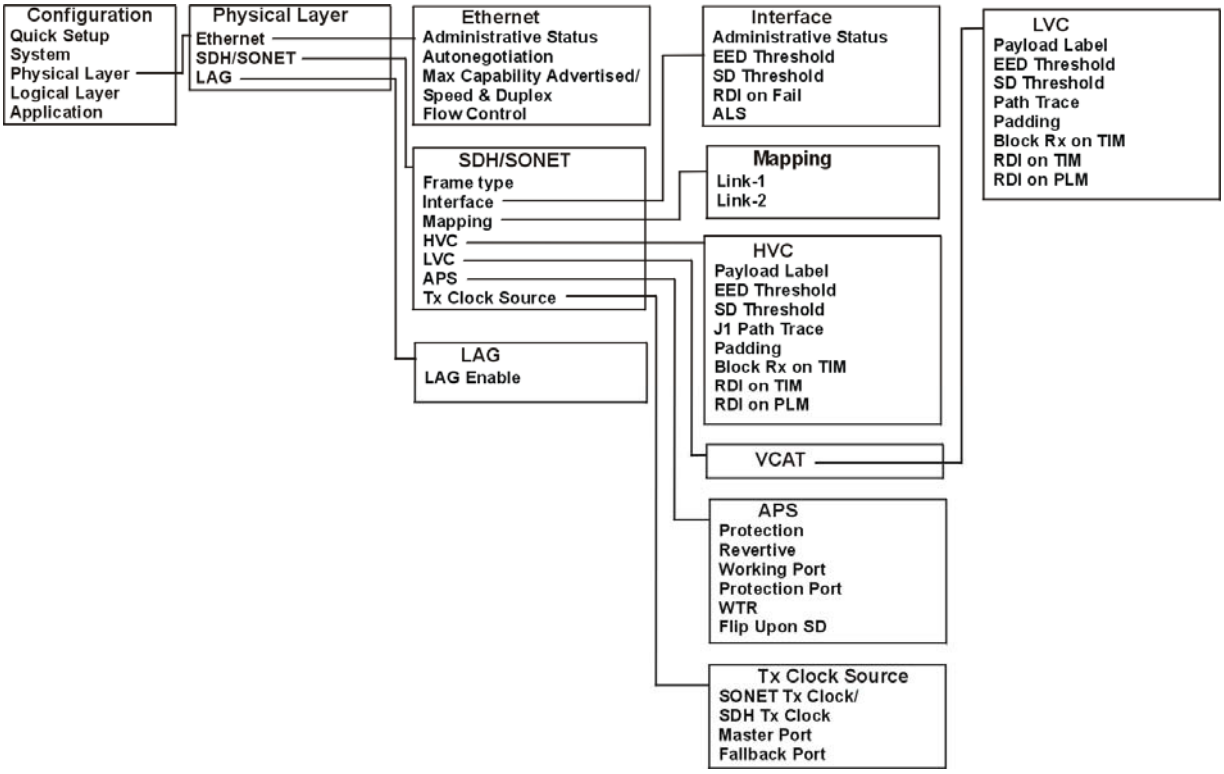


Figure 3-6. Configuration › Physical Layer

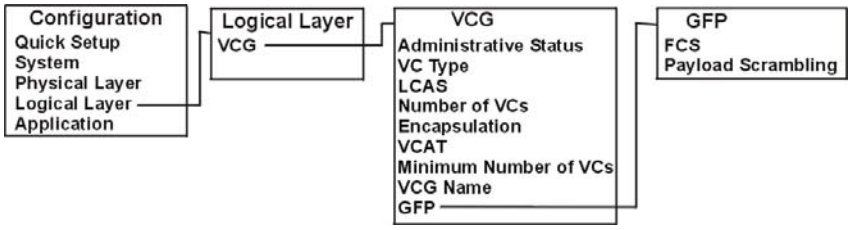


Figure 3-7. Configuration › Logical Layer

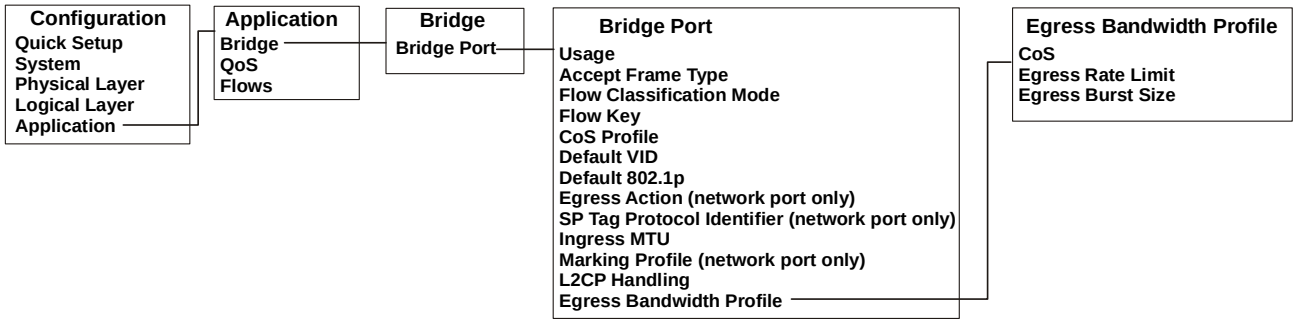


Figure 3-8. Configuration › Application › Bridge Port

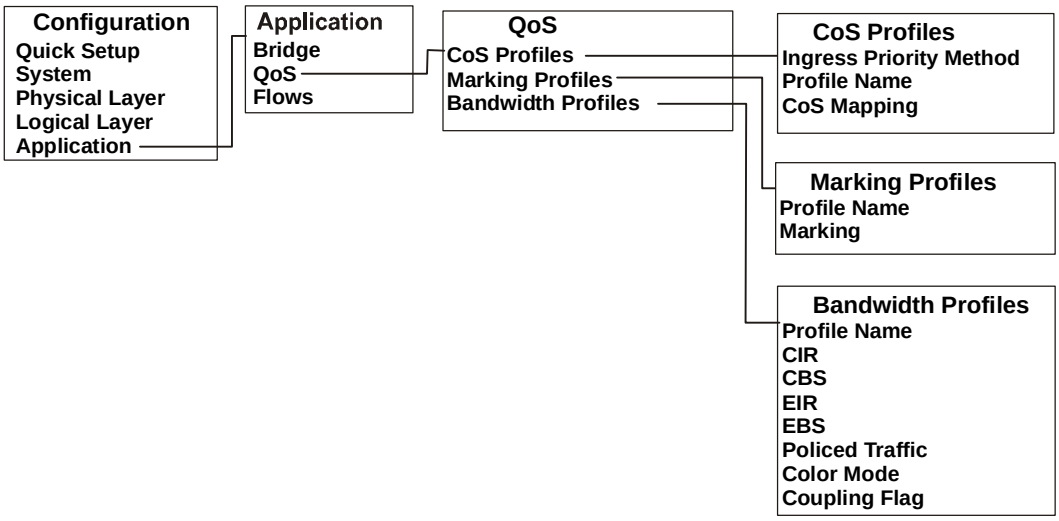


Figure 3-9. Configuration › Application › QoS

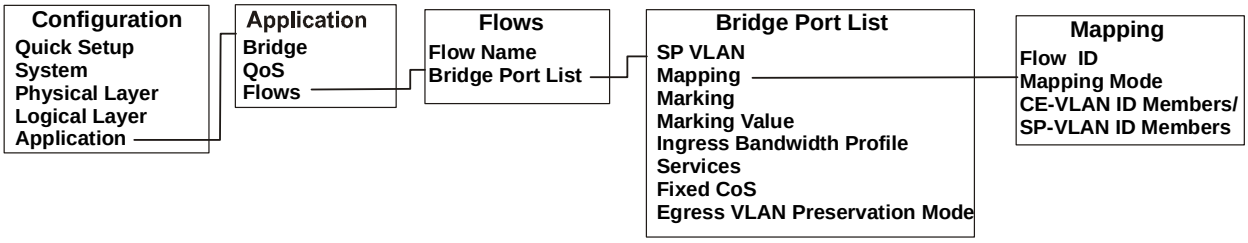


Figure 3-10. Configuration › Application › Flows

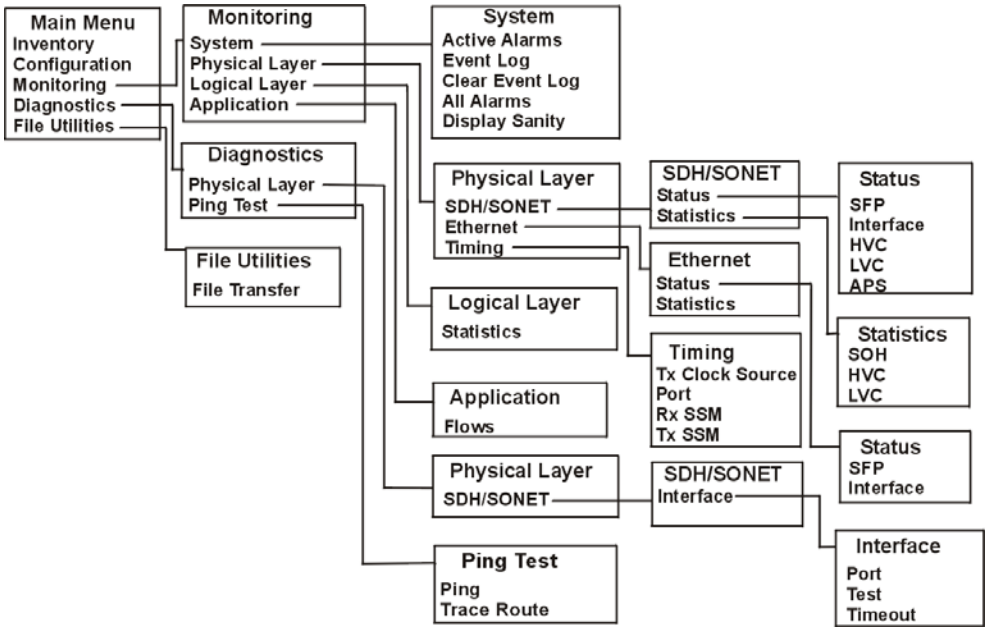


Figure 3-11. Monitoring, Diagnostics

3.5 Turning Off the Unit

➤ To power off the unit:

- Remove the power cord from the power source.

Chapter 4

Configuration

This chapter illustrates the configuration RICi-622GE screens and explains their parameters. The menu tree of the RICi-622GE management software is shown in *Chapter 3*.

For your convenience, parameters that are mandatory for configuration, such as RICi-622GE host IP settings, are located in the Quick Setup menu (**Main menu** > **Configuration** > **Quick Setup**). This menu is explained in the Quick Start Guide at the beginning of the manual, and the menu parameters are explained in the relevant sections of this chapter.

4.1 Configuring RICi-622GE for Management

Usually, initial configuration of the management parameters is performed via ASCII terminal. Once the RICi-622GE host IP parameters are set, it is possible to access it via Telnet, ConfiguRAD, or SNMP-based management system for operation configuration.

Perform the following steps to configure RICi-622GE for management:

- *Defining Host IP Parameters*
- *Entering Device Information*
- *Configuring Host Encapsulation*
- *Controlling Management Access*
- *Configuring User Access*
- *Configuring Network Managers*
- *Configuring SNMPv3*
- *Configuring RADIUS Client*
- *Configuring Control Port Parameters*.

Defining Host IP Parameters

RICi-622GE can be managed by a network management station that is located on the LAN connected to the unit's network or first user port, or out-of-band Fast Ethernet management port. In order to establish a proper connection, it is necessary to define the host IP address, subnet mask, and default gateway.

➤ **To define the host IP parameters:**

- From the Host menu (**Configuration** > **System** > **Management**> **Host**), perform the following:
  - Select **IP Address** to define the host IP address
  - Select **IP Mask** to define the host IP mask
  - Select **Default Gateway** to enter the default gateway IP address.

Note *The default gateway must be in the same subnet as the host.*

If SNMPv3 is not enabled, then in order to establish a proper SNMP management link, you must specify the read community, write community, and trap community. These community parameters are in the menu only if SNMPv3 is not enabled.

➤ **To configure RICi-622GE communities:**

- From the Host menu (**Configuration** > **System** > **Management**> **Host**), do the following:
  - Select **Read community** to enter the name of a community with read-only authorization (up to 20 alphanumeric characters, case sensitive).
  - Select **Write community** to enter the name of a community with write authorization (up to 20 alphanumeric characters, case sensitive).
  - Select **Trap community** to enter the name of a community to which RICi-622GE sends traps (up to 20 alphanumeric characters, case sensitive).

Note *You must assign different names to the Read and Write communities.*

```
                          RICi-622GE
Configuration>System>Management>Host

 1. IP address                    ... (0.0.0.0)
 2. IP mask                       ... (0.0.0.0)
 3. Default Gateway               ... (0.0.0.0)
 4. Read community                ... (public)
 5. Write community               ... (private)
 6. Trap community                ... (public)
 7. Encapsulation                     >

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-1. Host Menu, SNMPv3 not enabled

```
                              RICi-622GE
Configuration>System>Management>Host

 1. IP address                    ... (0.0.0.0)
 2. IP mask                       ... (0.0.0.0)
 3. Default Gateway               ... (0.0.0.0)
 4. Encapsulation                     >

>

ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-2. Host Menu, SNMPv3 enabled

Entering Device Information

The RICi-622GE management software allows you to assign a name to the unit, specify its location to distinguish it from the other devices installed in your system, and assign a contact person.

➤ To enter device information:

1. From the Device Information menu (Configuration › System › Management › Device Information), select Name and enter a name for the RICi-622GE unit.
2. Select Location and enter the name for the current RICi-622GE location.
3. Select Contact and enter the name of a contact person.

```
                              RICi-622GE
Configuration>System>Management>Device Information
Description       ... RICi-622GE

1. Name           ... (RICi-622GE)
2. Location       ... (The Location of the Device)
3. Contact        ... (Name of Contact Person)

>

ESC-prev.menu; !-main menu; &-exit                         1 M/2 C
```

Figure 4-3. Device Info Menu

Configuring Host Encapsulation

RICi-622GE management software allows you to create a dedicated management VLAN in order to separate management traffic from the user data.

➤ To configure the host encapsulation:

- From the Encapsulation menu (Configuration › System › Management› Host › Encapsulation), do the following:

- Select **Host Tagging**, and choose **Yes** or **No** to consider or ignore the VLAN tagging of the management traffic coming from the management station.
- If host tagging is enabled:
  - Select **Host VLAN ID** and define the ID of the host VLAN (**1–4094**)
  - Select **Host Priority Tag** and define the priority of the host VLAN (**0–7**).
- If host tagging is disabled:
  - Select **SP Management VLAN ID** and define the VID for management traffic towards the SP network (**1–4094**).
  - Select **SP Management Priority Tag** and define the VLAN priority for management traffic towards the SP network (**0–7**).
- Select **Security Definition** and define the network/user ports from which the manager can access RICi-622GE. Possible values are:
  - **All** – RICi-622GE can be accessed via any of its ports
  - **SDHSONET Only** – RICi-622GE can be accessed via only SDH/SONET port and Fast Ethernet management port
  - **GBE Only** – RICi-622GE can be accessed via only Gigabit Ethernet port and Fast Ethernet management port
  - **None** – RICi-622GE can be accessed via only Fast Ethernet management port.

```
                                RICi-622GE
Configuration>System>Management>Host>Encapsulation

1. Host Tagging                          (Yes)
2. Host VLAN ID [1 - 4094]            ... (300)
3. Host Priority Tag [0 - 7]          ... (7)
4. Security Definition                >  (All)

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-4. Encapsulation Menu, Host Tagging Enabled

```
                                RICi-622GE
Configuration>System>Management>Host>Encapsulation

1. Host Tagging                          (No)
2. SP Management VLAN ID [1 - 4094]   ... (300)
3. SP Management Priority Tag [0 - 7] ... (7)
4. Security Definition                ... (All)

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-5. Encapsulation Menu, Host Tagging Disabled

Controlling Management Access

You can enable or disable access to the RICi-622GE management system via SNMP, Telnet, or Web-based application. If SNMP, Telnet, and Web access is disabled, RICi-622GE can be managed only via an ASCII terminal. In addition, you can limit access to RICi-622GE to only the stations defined in the manager list.

➤ **To define the management access method:**

1. From the Management Access menu (**Configuration** › **System** › **Management** › **Management Access**):
   - Select **Telnet/SSH Access** to configure Telnet access
   - Select **SNMP** to configure SNMP access
   - Select **Web** to configure Web access.
2. Define the access mode for the selected management method:
   - Enable – selected management method is enabled
   - Disable – selected management method is disabled.
   - Enable Secure (not relevant for SNMP):
     - SSH-enabled secure access for Secure Shell is enabled if management method is **Telnet/SSH**
     - SSL-enabled secure access for Web is enabled if management method is **Web Access**.

```
                              RICi-622GE
Configuration>System>Management>Management Access

1. User Access                    >
2. Telnet/SSH access              >  (Disable)
3. WEB                            >  (Enable)
4. SNMP                           >  (Enable)
5. Radius Authentication          >  (Enable Remote)
6. RADIUS Parameters              >

>
ESC-prev.menu; !-main menu; &-exit                                1 M/2 C
```

Figure 4-6. Management Access Menu

Configuring User Access

RICi-622GE allows the definition of new users and their access levels. Only superusers can define new users, while regular users can change their passwords.

➤ **To add a new user:**

1. Make sure that you are logged in as **su**.
2. From the Management Access menu (**Configuration** › **System** › **Management** › **Management Access**), select **User Access**.

The User Access menu is displayed (see *Figure 4-7*).

3. From the User Access menu, do the following:
   - Select **User name**, and enter a name for a new user.
   - Select **Permission**, and specify the user's access rights (full control or read only).
   - Select **Access**, and specify the user's access methods (Terminal, Telnet/SSH, Web, Telnet and Web, or all of them).
   - Select **'su' password**, and enter your current superuser password.
   - Select **New password**, and assign a password to a new user name.
   - Select **Confirm** and re-enter the new user password to confirm it.

➤ **To delete an existing user:**

- From the User Access menu, do the following:
  - Type **F** to display a user that you intend to delete.
  - Select **'su' password**, and enter your current superuser password.

Type **D** to delete the current user.

```
                                RICi-622GE
Configuration>System>Management>Management Access>User Access

1. User name                    ... (su)
2. Permission                   >   (Full Control)
3. Access                       >   (All)
4. 'su' password                ... ()
5. New password                 ... ()
6. Confirm New Password         ... ()

>

Please select item <1 to 6>
ESC-prev.menu; !-main menu; &-exit                              1 M/2 C
```

Figure 4-7. User Access Menu

Configuring Network Managers

You can configure up to 10 network managers to which the RICi-622GE SNMP agent sends traps. In addition, you can temporarily prevent a manager station from receiving traps by masking the network manager.

➤ **To configure network managers:**

- From the Manager List menu (**Configuration** › **System** › **Management** › **Manager List**), do the following in the manager list table entry:
  - Select **IP address** and enter the IP address
  - Select **Trap** and configure to the appropriate value:
    - Masked –All alarm traps are masked

- Unmasked – All alarms are enabled. The manager is informed of the occurrence of any alarm (entry or exit to/from alarm state).

```
                              RICi-622GE
Configuration>System>Management>Manager list

Num          IP address        Trap
1            198.25.6.2        (Unmasked)
2            0.0.0.0           (Unmasked)
3            0.0.0.0           (Unmasked)
4            0.0.0.0           (Unmasked)
5            0.0.0.0           (Unmasked)
6            0.0.0.0           (Unmasked)
7            0.0.0.0           (Unmasked)
8            0.0.0.0           (Unmasked)
9            0.0.0.0           (Unmasked)
10           0.0.0.0           (Unmasked)
>

ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-8. Manager List Menu

Configuring SNMPv3

RICi-622GE supports the SNMP version 3 entity, providing secure access to the device by authenticating and encrypting packets transmitted over the network. When SNMPv3 is disabled, RICi-622GE supports SNMPv1.

Follow these steps to configure the SNMPv3 entity:

1. Enable SNMPv3.
2. Add a new user.
3. Add a new notification entry.
4. Assign traps to notification entries.
5. Configure target (NMS) parameters.
6. Specify the target address, define its parameter set, and assign notification tags.
7. Map SNMPv3 settings to SNMPv1 settings (if necessary).

Enabling SNMPv3

The SNMPv3 entity is enabled from the Management menu.

➤ To enable SNMPv3:

1. From the Management menu (**Configuration** › **System** › **Management**), select **SNMPv3** and enable the SNMPv3 entity.

2. Type **S** to save your changes.

   A confirmation message appears.

```
CURRENT CONFIGURATION OF SNMP AGENT WILL BE DELETED! CONTINUE? (Y/N)
```

3. Type **Y** to confirm or **N** to cancel.

   If you type Y, SNMPv3 is enabled and the SNMPv3 Settings line appears in the Management menu.

➤ **To configure SNMPv3:**

1. From the Management menu (**Configuration** › **System** › **Management**), select SNMPv3 Settings.

   The SNMPv3 Settings menu appears (see *Figure 4-9*).

   The SNMPv3 Settings menu includes the following information:

   - Engine Boots (The number of times that the SNMP engine has reinitialized since its identification was last configured.)
   - Engine Time (The number of seconds since the last SNMP engine boot)
   - SNMP Message Size (The maximum length of an SNMP message (in octets) that the SNMP engine can send or receive and process.)

```
                                RICi-622GE
Configuration>System>Management>SNMPv3 Settings

    Engine Boots                    (4)
    Engine Time                     (10044)
    SNMP Message Size            ... (1500)
1. Users                        >
2. Targets & Notify           >
3. SNMPv1/v3 Mapping            >
4. SNMPv3 Factory Defaults
5. Summary User Table         []
6. Summary Target Table           []

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-9. SNMPv3 Settings Menu

Adding SNMPv3 Users

➤ **To add an SNMPv3 user:**

1. From the SNMPv3 Users menu (**Configuration** › **System** › **Management** › **SNMPv3 Settings** › **Users**), perform the following:

   - Select **Security Name** and enter security name for a new user (up to 32 alphanumeric characters).

- Select **Authentication Protocol** and define the authentication protocol to be used for authenticating the user:
  - usmNoAuthProtocol (No authentication is performed)
  - usmHMACMD5AuthProtocol (MD5 protocol)
  - usmHMACSHAAuthProtocol (SHA protocol).
- Select **Privacy Protocol** and define the type of privacy protocol to be used for encryption:
  - usmNoPrivProtocol (Privacy protocol is not used)
  - usmDESPrivProtocol (DES protocol).
- Select **Authentication Password** and define the authentication password of the user. This is not available if authentication has been disabled.
- Select **Privacy Password** and define the private key used for encryption. This is not available if privacy has been disabled.

2. To view the summary of the SNMPv3 user configuration, select **Summary User Table** from the SNMPv3 Settings menu (**Configuration** > **System** > **Management** > **SNMPv3 Settings**).

➤ **To delete an SNMPv3 user:**

1. From the Users menu (**Configuration** > **System** > **Management** > **SNMPv3 Settings** > **Users**), type **f** or **b** to select an SNMPv3 user.
2. Type **r** to delete the selected user.

Adding Notification Entries

➤ **To add a notification entry:**

1. From the Targets and Notify menu (**Configuration** > **System** > **Management** > **SNMPv3 Settings** > **Targets & Notify**), select **Notify**.

   The Notify menu appears (see *Figure 4-11*).

2. From the Notify menu, do the following:
   - Select **Name** and enter an ASCII string identifying the notification entry
   - Select **Type** and enter the type of notification entry
   - Select **Tag** and enter a tag value to be associated with the notification entry. This tag is used to identify the current notification entry when configuring the target address.

```
                                RICi-622GE
Configuration>System>Management> SNMPv3 Settings> Targets & Notify

1. Target Params       ...()
2. Target Address      ...()
3. Notify              ...()
4. Trap                ...()

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-10. Targets & Notify Menu

```
                                RICi-622GE
Configuration>System>Management> SNMPv3 Settings> Targets and Notify > Notify

5. Name                ...()
6. Type                ...()
7. Tag                 ...()

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-11. Notify Menu

Assigning Traps

One or more traps must be assigned to each notification entry.

➤ To assign traps to notification entries:

- From the Trap menu (Configuration › System › Management › SNMPv3 Settings › Targets & Notify ›Trap), do the following:
  - Select Notify Name and enter a tag from the list of previously defined notification tags)
  - Select Trap Name and enter a trap to be assigned to the selected tag.

```
                                RICi-622GE
Configuration>System>Management> SNMPv3 Settings> Targets and Notify > Trap

1. Notify Name         >()
2. Trap Name           >()

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-12. Trap Menu

Configuring Target Parameters

The SNMPv3 network management station to which RICi-622GE sends trap notifications is referred to as a target. A set of parameters must be configured and assigned to each target.

➤ To configure target parameters:

- From the Target Params menu (**Configuration > System > Management > SNMPv3 Settings > Targets and Notify > Target Params**), do the following:
  - Select **Name** and enter an ASCII string identifying the current set of target parameters
  - Select **Message Processing Model** and enter the Message Processing Model to be used when generating SNMP messages using this entry:
    - SNMPv1
    - SNMPv2c
    - SNMPv2u
    - SNMPv3.
  - Select **Security Model** and enter the Security Model to be used when generating SNMP messages using this entry:
    - Any
    - SNMPv1
    - SNMPv2c
    - User-Based Security Model (USM).
  - Select **Security Name** and enter identification of the principal on whose behalf SNMP messages are to be generated using this entry. This can be either SNMPv3 user or SNMPv1/SNMPv2 community string.
  - Select **Security Level** and enter the level of security to be used when generating SNMP messages using this entry:
    - noAuthNoPriv – Authorization and privacy are disabled
    - authNoPriv – Authorization is enabled, privacy is disabled)
    - authPriv – Authorization and privacy are enabled.

```
                                RICi-622GE
Configuration>System>Management> SNMPv3 Settings> Targets and Notify > Target
Params

1.  Name                        ... ()
2.  Message Processing Model    >   ()
3.  Security Model              >   ()
4.  Security Name               ... ()
5.  Security Level              >   ()

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-13. Target Params Menu

Configuring Target Address

Each target must have a valid IP address. Also, a previously configured parameter set and notification tags must be assigned to the target.

➤ To configure the target address:

1. From the Target Address menu (Configuration > System > Management > SNMPv3 Settings > Targets and Notify > Target Address), do the following:
   - Select Name and enter an ASCII string identifying the target
   - Select IP Address and enter valid IP address of the NMS. The IP address must be in xxx.xxx.xxx.xxx:162 format, where 162 is a standard SNMP port used for sending traps.
   - Select Params Name and enter name of the previously defined target parameter set to be assigned to this target
   - Select Tag List and enter list of previously defined notification tags.
2. To view the summary of the SNMPv3 target configuration, select Summary Target Table from the SNMPv3 Settings menu (Configuration > System > Management > SNMPv3 Settings).

```
                                RICi-622GE
Configuration>System>Management>SNMPv3 Settings>Targets and Notify>Target Address

1.  Name                ... ()
2.  IP Address          ... ()
3.  Params Name         ... ()
4.  Tag List            ... ()

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-14. Target Address Menu

Mapping SNMPv1 to SNMPv3

RICi-622GE supports coexistence of different SNMP versions by mapping SNMPv1/SNMPv2 community name to the SNMPv3 security name value. The mapping is performed according to the requirements in RFC 3587.

➤ To map SNMPv1 to SNMPv3:

- From the SNMPv1/v3 Mapping menu (Configuration > System > Management > SNMPv3 Settings > SNMPv1/v3 Mapping), do the following:
  - Select Community Index and enter SNMP community index
  - Select Community String and enter SNMPv1/SNMPv2 community name
  - Select Security Name and enter SNMPv3 security name mapped to the SNMPv1/SNMPv2 community name
  - Select Transport Tag and enter a set of transport endpoints that are used in two ways:

- To specify the transport endpoints from which an SNMP entity accepts management requests
- To specify the transport endpoints to which a notification may be sent using the community string matching the corresponding instance of community name.)

```
                                RICi-622GE
Configuration>System>Management>SNMPv3 Settings>SNMPv1/v3 Mapping

1. Community Index      ... ()
2. Community Name       ... ()
3. Security Name        ... ()
4. Transport Tag        ... ()

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-15. SNMPv1/v3 Mapping Menu

Returning to SNMPv3 Factory Defaults

The SNMPv3 factory default option allows you to reset the SNMPv3 parameters to factory default values.

➤ To return to SNMPv3 factory default values:

1. From the SNMPv3 Settings menu (Configuration › System › Management › SNMPv3 Settings), select SNMPv3 Factory Defaults.

   A confirmation message appears.

```
THE SNMPV3 SETUPS WILL REINITIALIZE. DO YOU WANT TO PROCEED? (Y/N)
```

2. Type **Y** to confirm or **N** to cancel.

   If you type **Y**, the device is reset to SNMPv3 factory default values.

Configuring RADIUS Client

The RADIUS (Remote Authentication Dial-In User Service) is a client/server security protocol. Security information is stored in a central location, known as the RADIUS server. RADIUS clients, such as RICi-622GE, communicate with the RADIUS server to authenticate users. RICi-622GE supports up to four RADIUS servers.

➤ To configure the RADIUS client:

1. From the RADIUS Parameters menu (**Configuration** › **System** › **Management** › **Management Access** › **RADIUS Parameters**), type **f** to select a RADIUS server that you intend to configure.

   The Server Status parameter indicates the current status of the selected server. The status is one of the following:

   - Connected – Selected server is currently operating as an active RADIUS server

- Not Connected – Selected server is a backup RADIUS server
- Disconnected – Connection to the selected server has timed out.

2. Configure the following parameters:
   - **Server Access** – Disables or enables the RADIUS server
   - **Server IP Address** – IP address of the RADIUS server.
   - **Key String** – The shared secret is a password used by RADIUS to authenticate the client. RICi-622GE encrypts the user-password, if present; using the secret it shares with the RADIUS server. Any alphanumeric string up to 16 characters is permitted.
   - **Number of retries** – The number of retries to be made when sending request to the RADIUS server): Permitted values are 0–5.
   - **Timeout** – The maximum time RICi-622GE waits for a single request response from the RADIUS server (in seconds). After this time the request is retransmitted.): Permitted values are 0–60.
   - **Authentication Port** – The UDP port number to be used for the RADIUS authentication application. You must define the same value in the RADIUS server.): any valid UDP port number.

```
                                RICi-622GE
Configuration>System>Management>Management Access>Radius Parameters

    Server Sequence Number          (1)
    Server Status                   (Not connected)
1.  Server access                   (Enable)
2.  Server IP address               (172.17.150.71)
3.  Key String                      (******)
4.  Number of Retries [0-10]        (3)
5.  Timeout (in seconds) [1-5]      (2)
6.  Authentication Port [1-65535]   (1812)

>
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-16. Radius Parameters Menu

➤ **To configure RADIUS operation mode:**

- From the **Management Access** menu (**Configuration** > **System** > **Management** > **Management Access**), select **RADIUS Authentication** and select one of the authentication modes:
  - Disable – RADIUS authentication is disabled
  - Enable Remote – RICi-622GE uses authentication database stored at the RADIUS server to check if the entered user name and password match the data server records. User authentication fails if one the following occurs:
    - No user name record is found
    - Password does not match user name
    - Connection to the RADIUS server is lost.

Note *Special rules apply to the **su** (superuser) user name. If connection to the RADIUS server is lost, RICi-622GE uses its internal authentication database for the user verification and allows login for the superuser.*

- Enable Remote Local – RICi-622GE uses authentication database stored at the RADIUS server to check if the entered user name and password match the data server records. If no user name record is found or a password does not match user name, RICi-622GE uses its internal authentication database.

Note *You must set the RADIUS server IP address in the RADIUS parameters menu before you can enable RADIUS authentication.*

Configuring Control Port Parameters

RICi-622GE management software allows you to configure the control port parameters, which include specifying the terminal data rate, data bits, parity, stop bits, and security timeout.

➤ To configure the control port parameters:

- From the Control Port menu (Main › Configuration › System › Control Port), do the following:
- Select Baud Rate to specify the data rate (permitted values are 9600 bps; 19,200 bps; or 115,200 bps).
- Select Data bits to specify the data bits (7 or 8)
- Select Parity to specify the parity (None, Odd, or Even)
- Select Stop Bits to specify the stop bits (NA, 1, 1.5, or 2)
- Select Terminal and then Security Timeout to specify the number of minutes to keep a ConfiguRAD or Terminal session active when there is no user input (1–60).

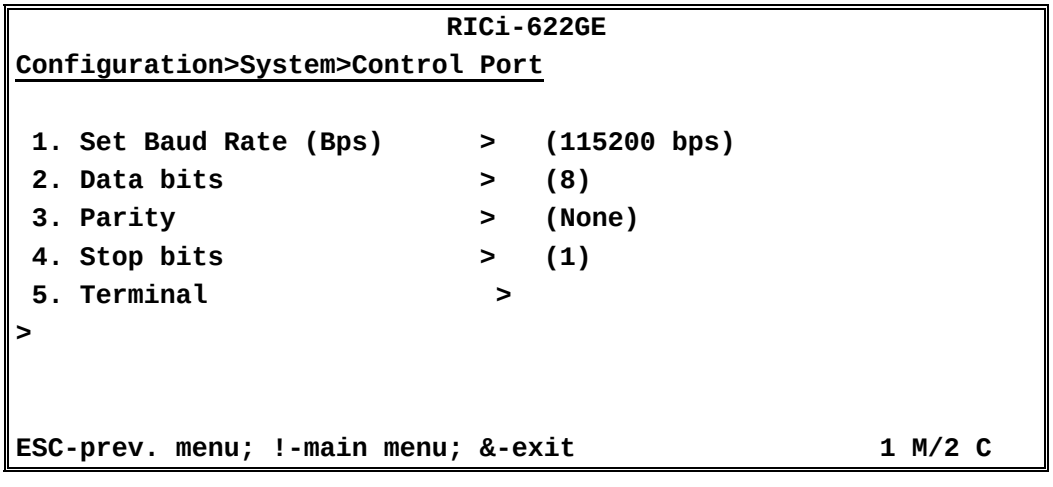


Figure 4-17. Control Port Menu

```
                          RICi-622GE
Configuration>System>Control Port > Terminal

 1. Security Timeout (min) [1 – 60]      >   (10)
>



ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-18. Terminal Menu

4.2 Configuring RICi-622GE for Operation

The recommended configuration procedure for RICi-622GE includes the following stages:

1. Configuring Ethernet and SDH/SONET interfaces at the physical level
2. Configuring Fault Propagation
3. Configuring VCGs at the logical level
4. Configuring RICi-622GE at the application level:
   - Configuring bridge port parameters
   - Configuring QoS parameters
   - Configuring Ethernet flows.

Setting Physical Layer Parameters

RICi-622GE includes two STM-4/OC-12 ports (optionally redundant), two Gigabit Ethernet user ports (optionally redundant), and a Fast Ethernet management port. The Fast Ethernet management port is not user-configurable. It is automatically configured by the system for autonegotiation and full duplex mode.

Configuring Ethernet Interface

The following parameters can be configured for the Gigabit Ethernet ports at the physical level:

- Administrative status
- Autonegotiation
- Maximum advertised capability for autonegotiation procedure
- Data rate and duplex mode, when autonegotiation is disabled
- Ethernet link aggregation.

Configuring Ethernet Port Parameters

➤ To configure a Gigabit Ethernet port:

1. From the Ethernet menu (**Configuration** > **Physical Layer** > **Ethernet**), select the port to configure.
2. Configure the parameters as detailed in *Table 4-1*.

```
                              RICi-622GE
Configuration>Physical layer>Ethernet

 1. Port                                (ETH-1)
 2. Administrative Status               (Up)
 3. Autonegotiation                     (Enable)
 4. Max Capability Advertised           (1000BaseT Full Duplex)

F - Forward
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-19. Ethernet Menu, Autonegotiation Enabled

```
                              RICi-622GE
Configuration>Physical layer>Ethernet

 1. Port                                (ETH-1)
 2. Administrative Status               (Up)
 3. Autonegotiation                     (Disable)
 4. Speed and Duplex                    (1000BaseT Full Duplex)

F - Forward ;
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-20. Ethernet Menu, Autonegotiation Disabled

Table 4-1. Ethernet Parameters

Parameter	Description	Values
Administrative Status	Defines whether port is available for operation.	**Up** – Ethernet port is enabled **Down** –Ethernet port is disabled
Autonegotiation	Defines whether port performs autonegotiation.	**Enable** – Autonegotiation mode is enabled **Disable** – Autonegotiation mode is disabled
Max Capability Advertised	Defines the highest traffic handling capability to be advertised during autonegotiation process. This is configurable for only RJ-45 copper interface ports.	**10BaseT Half Duplex** **10baseT Full Duplex** **100baseT Half Duplex** **100baseT Full Duplex** **1000base T Full Duplex**

Parameter	Description	Values
Speed and Duplex	Defines the speed and duplex mode for autonegotiation. This is configurable for only RJ-45 copper interface ports, when autonegotiation is disabled.	10BaseT Half Duplex 10baseT Full Duplex 100baseT Half Duplex 100baseT Full Duplex 1000base T Full Duplex

Configuring Ethernet Redundancy

You can enable redundancy for the Gigabit Ethernet ports, so that one port is active and the other is standby, by configuring LAG (link aggregation) for the Ethernet ports.

➤ To configure the Gigabit Ethernet link aggregation:

1. From the Physical Layer menu (Configuration > Physical Layer), select LAG.

   The LAG menu appears, indicating the Link Aggregation status (enabled or disabled).

2. From the LAG menu, select LAG Enable and set it to Enable or Disable.
3. Type % to update the database with your change.

   A confirmation message appears.

```
Are you sure you want to update configuration? (Y/N)
```

4. Type Y to confirm.

   The change to the link aggregation status is applied.

When LAG is enabled, the two Gigabit Ethernet ports are treated as one unit in the bridge port and flow menus, i.e. instead of screens for ports ETH-1 and ETH-2, there is one screen with LAG-1.

```
                          RICi-622GE
Configuration>Physical layer

 1. SONET/SDH                        >
 2. Ethernet                         >
 3. LAG                              >


>
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-21. Physical Layer Menu

```
                          RICi-622GE
Configuration>Physical layer>LAG

1. LAG Enable                      > (Disable)

>
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-22. LAG Menu, LAG Disabled

```
                          RICi-622GE
Configuration>Physical layer>LAG

LAG Is Active On ETH1-ETH2!
 1. LAG Enable                     > (Enable)

>
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-23. LAG Menu, LAG Enabled

Configuring SDH/SONET Interface

Frame type, transmit clock source, VCG mapping, Automatic Protection Switching (APS), interface parameters, and HVC parameters can be configured for the SDH/SONET ports at the physical level.

Configuring SDH/SONET Port Parameters

➤ To configure SDH/SONET frame type:

1. From the SDH/SONET menu (Configuration > Physical Layer > SONET/SDH), select Frame type to specify the frame type (SDH or SONET).

   A confirmation message appears.

```
Are you sure you want to reset device (Y/N)?
```

2. Type Y to confirm or N to cancel.

   If you type Y, the frame type is set to the specified value, and the unit resets.

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET

 1. Frame type                          > (SDH)
 2. Interface                           >
 3. Mapping                             >
 4. HVC                                 >
 5. LVC                                 >
 6. APS                                 >
 7. Tx Clock Source                     >
>

ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-24. SDH/SONET Menu

➤ To configure SDH/SONET port interface parameters:

1. From the SDH/SONET Interface menu (**Configuration** › **Physical Layer** › **SONET/SDH** › **Interface**), select the link to configure.
2. Configure the parameters as detailed in *Table 4-2.*

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>Interface

 1. Link [1-2]…                         (1)
 2. Administrative Status               (Up)
 3. EED Threshold                       (1E-3)
 4. SD Threshold                        (1E-5)
 5. RDI on Fail                         (Disable)
 6. ALS                                 (Enable)
>

F - Forward ;
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-25. SDH/SONET Interface Menu

Table 4-2. SDH/SONET Interface Parameters

Parameter	Description	Values
Administrative Status	Defines whether port is available for operation.	**Up** – SDH/SONET port is enabled **Down** –SDH/SONET port is disabled
EED Threshold	Defines the BER value that if exceeded results in the generation of the error rate degradation alarm	10^{-3}, 10^{-4}, 10^{-5}

Parameter	Description	Values
SD Threshold	Selects the BER value that if exceeded results in the generation of the signal degraded alarm	10^{-6}, 10^{-7}, 10^{-8}, 10^{-9}
RDI on Fail	Defines the sending of Remote Defect Indication (RDI) if the link fails	**Enable** – Send RDI if link fails **Disable** – Do not send RDI if link fails
ALS	Enables/disables the automatic laser shutdown (ALS) function. The ALS function automatically switches off the transmitter of a regenerator section in case of cable break	**Enable** – ALS function is enabled **Disable** – ALS function is disabled

➤ To configure SDH/SONET port HVC parameters:

1. From the SDH/SONET HVC menu (**Configuration** › **Physical Layer** › **SONET/SDH** › **HVC**), select the link, VC4/STS3, and STS-1 to configure.
2. Configure the parameters as detailed in *Table 4-3.*

```
                          RICi-622GE
Configuration>Physical layer>SDH/SONET>HVC

   Link [1-2]>                          (1)
   VC-4\STS3 [1-4]                      (01)
 1. Payload Label [0 – ff]              (02)
 2. EED Threshold                       (1E-3)
 3. SD Threshold                        (1E-6)
 4. J1 path trace                       (rici622ge)
 5. Padding   >                         (Spaces)
 6. Block Rx on TIM                     (Disable)
 7. RDI on TIM                          (Disable)
 8. RDI on PLM                          (Disable)

F - Forward ;
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-26. SDH/SONET HVC Menu

Table 4-3. SDH/SONET HVC Parameters

Parameter	Description	Values
Payload Label	Defines the payload label to attach to packets	00 - FF
EED Threshold	Defines the Bit Error Rate (BER) value that if exceeded results in the generation of the error rate degradation alarm	10^{-3}, 10^{-4}, 10^{-5}

Parameter	Description	Values
SD Threshold	Selects the Bit Error Rate (BER) value that if exceeded results in the generation of the signal degraded alarm	10^{-6}, 10^{-7}, 10^{-8}, 10^{-9}
J1 path trace	Specifies the J1 path trace label	Alphanumeric string of up to 15 characters. If fewer than 15 characters are typed, the Padding parameter is used to pad the path trace label
Padding	Defines the type of characters used to pad the path trace label, when it is shorter than the required length of 15 characters	**NULL** – Null characters **Spaces** – Space characters
Block Rx on TIM	Defines whether to block the traffic if Trace Identifier Mismatch (TIM) occurs	**Enable** – Block the traffic on path trace mismatch **Disable** – Do not block the traffic on path trace mismatch
RDI on TIM	Defines the sending of Remote Defect Indication (RDI) if Trace Identifier Mismatch (TIM) occurs	**Enable** – Send RDI if TIM occurs **Disable** – Do not send RDI if TIM occurs
RDI on PLM	Defines the sending of Remote Defect Indication (RDI) if Payload Label Mismatch (PLM) occurs	**Enable** – Send RDI if PLMoccurs **Disable** – Do not send RDI if PLM occurs

➤ **To configure SDH/SONET port LVC parameters:**

1. From the SDH/SONET LVC VCAT menu (**Configuration** › **Physical Layer** › **SONET/SDH** › **LVC** › **VCAT**), select the VCG to configure.
2. Configure the parameters as detailed in *Table 4-4.*

```
                          RICi-622GE
Configuration>Physical layer>SDH/SONET>LVC>VCAT

 1. VCG                                (VCG-1)
 2. Payload Label [0 – ff]             (02)
 3. EED Threshold                      (1E-3)
 4. SD Threshold                       (1E-6)
 5. Path trace                         (rici622ge)
 6. Padding   >                        (NULL)
 7. Block Rx on TIM                    (Disable)
 8. RDI on TIM                         (Disable)
 9. RDI on PLM                         (Disable)

%-Db Update; #-Undo; F - Forward
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-27. SDH/SONET LVC Menu

Table 4-4. SDH/SONET LVC Parameters

Parameter	Description	Values
Payload Label	Defines the payload label to attach to packets	00 - FF
EED Threshold	Defines the Bit Error Rate (BER) value that if exceeded results in the generation of the error rate degradation alarm	10^{-3}, 10^{-4}, 10^{-5}
SD Threshold	Selects the Bit Error Rate (BER) value that if exceeded results in the generation of the signal degraded alarm	10^{-6}, 10^{-7}, 10^{-8}, 10^{-9}
Path trace	Specifies the path trace label	Alphanumeric string of up to 15 characters. If fewer than 15 characters are typed, the Padding parameter is used to pad the path trace label
Padding	Defines the type of characters used to pad the path trace label, when it is shorter than the required length of 15 characters	**NULL** – Null characters **Spaces** – Space characters
Block Rx on TIM	Defines whether to block the traffic if Trace Identifier Mismatch (TIM) occurs	**Enable** – Block the traffic on path trace mismatch **Disable** – Do not block the traffic on path trace mismatch
RDI on TIM	Defines the sending of Remote Defect Indication (RDI) if Trace Identifier Mismatch (TIM) occurs	**Enable** – Send RDI if TIM occurs **Disable** – Do not send RDI if TIM occurs
RDI on PLM	Defines the sending of Remote Defect Indication (RDI) if Payload Label Mismatch (PLM) occurs	**Enable** – Send RDI if PLMoccurs **Disable** – Do not send RDI if PLM occurs

➤ **To configure SDH/SONET transmit clock source:**

- From the SDH/SONET transmit clock source menu (**Configuration** > **Physical Layer** > **SONET/SDH** > **Tx Clock Source**), configure the parameters as detailed in *Table 4-5*.

```
                          RICi-622GE
Configuration>Physical layer>SDH/SONET>Tx Clock Source

 1. SONET Tx Clock                          (Rx Clock)
 2. Master Port                             (Link-1)
 3. Fallback Port                           (Link-2)
>



ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-28. SDH/SONET Transmit Clock Source Menu

Table 4-5. SDH/SONET Transmit Clock Source Parameters

Parameter	Description	Values
SDH Tx Clock or SONET Tx Clock	Selects the timing reference source of the network interface transmit clock.	**Internal** – The transmit clock source is generated by the RICi-622GE internal oscillator **Rx clock** – Timing is recovered from the signal received by the SDH/SONET links
Master Port	Selects the master timing reference source. This parameter is displayed only when SDH/SONET Tx Clock is **Rx Clock**.	**Link-1** – Use SDH/SONET link 1 as master timing reference source **Link-2** – Use SDH/SONET link 2 as master timing reference source
Fallback Port	Selects the fallback timing reference source. This parameter is displayed only when SDH/SONET Tx Clock is **Rx Clock**.	**Link-1** – Use SDH/SONET link 1 as fallback timing reference source **Link-2** – Use SDH/SONET link 2 as fallback timing reference source **Internal** – Use RICi-622GE internal oscillator as fallback timing reference source If you select an SDH/SONET link as the fallback reference source, choose the link that is not in use as the master timing reference source

Configuring SDH/SONET Mapping

The default SDH/SONET mapping in RICi-622GE is shown in the following two figures. The mapping is shown for only Link 1, because the default APS configuration is that APS is active, therefore mapping can only be set up on Link 1. You can set up mapping for Link 2 only if APS is not active.

```
                          RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

              TUG3-1     TUG3-2        TUG3-3
VC4-1           [          VCG1            ]
VC4-2           [          VCG1            ]
VC4-3           [          VCG1            ]
VC4-4           [          VCG1            ]

1. None
2. VCG1

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-29. Default SDH/SONET Mapping, SDH

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

                STS1-1      STS1-2        STS1-3
STS3-1            [           VCG1            ]
STS3-2            [           VCG1            ]
STS3-3            [           VCG1            ]
STS3-4            [           VCG1            ]

1. None
2. VCG1

>

ESC-prev. menu; !-main menu; &-exit                          1 M/2 C
```

Figure 4-30. Default SDH/SONET Mapping, SONET

The numbered rows below the mapping show the values corresponding to potential VCGs to use in the mapping. Use the **None** value to remove the mapping for a VCG. When you create more VCGs, they are displayed in the numbered list. Refer to *Configuring the Logical Layer* for more information on creating VCGs.

The VCGs occupy the mapping to the SDH/SONET links according to their VC type, as illustrated in the following table.

Table 4-6. VCG Mapping

VC Type (SDH)	VC Type (SONET)	Mapping Occupancy
VC-3	STS-1	One entry
VC-4	STS-3c	One row
VC-4-4c	STS-12c	Entire link

➤ **To configure mapping:**

1. Navigate to the mapping menu for the SDH/SONET link for which you wish to perform mapping (**Configuration > Physical layer > SDH/SONET >Mapping> Link 1** or **Configuration > Physical layer > SDH/SONET >Mapping> Link 2**).

   The mapping menu appears.

2. Use the arrow keys to position the cursor where you want to change the mapping.
3. Type **1** and then <**Enter**> to remove the mapping if one already exists.
4. Type the value corresponding to the VCG that you want to map, and click <**Enter**>.

   The VCG is shown as mapped, according to its VC type. The following figures show examples of different types of mapping.

```
                          RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

             STS1-1     STS1-2        STS1-3
STS3-1         ---       ----            ---
STS3-2        |          VCG8               |
STS3-3        |                             |
STS3-4         ---       ----            ---

1. None       7. VCG6
2. VCG1       8. VCG7
3. VCG2       9. VCG8
4. VCG3
5. VCG4
6. VCG5

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-31. SDH/SONET Mapping of VCG with VC type STS-12c, SONET

```
                          RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

             STS1-1     STS1-2        STS1-3
STS3-1        [          VCG1            ]
STS3-2        [          VCG2            ]
STS3-3        [          VCG3            ]
STS3-4        VCG4       VCG5            VCG6

1. None       7. VCG6
2. VCG1       8. VCG7
3. VCG2       9. VCG8
4. VCG3
5. VCG4
6. VCG5

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-32. SDH/SONET Mapping of VCG with VC types STS-1 and STS-3c, SONET

Configuring SDH/SONET Automatic Protection Switching

By default, Automatic Protection Switching (APS) is active for the SDH/SONET links. In the SDH/SONET APS menu you can define whether APS is active, and which link is the primary link, and which link is the backup for the primary link.

➤ **To check if APS is active:**

- From the SDH/SONET menu (**Configuration** › **Physical Layer** › **SONET/SDH**), select **APS**.

  If APS is active, then the APS menu appears as shown in *Figure 4-33*, otherwise it appears with no parameters visible.

➤ **To enable APS:**

1. From the empty SDH/SONET APS menu, type **A** to add APS.

   The APS menu appears as shown in *Figure 4-33*.

2. Configure the APS parameters as detailed in *Table 4-7*.

3. Type **%** to save the change in the database.

   You are prompted to confirm device reset. After the reset, APS is enabled in the database.

➤ **To disable APS:**

1. From the SDH/SONET APS menu as shown in *Figure 4-33*, type **R** to remove APS.

   The APS menu appears empty as shown in *Figure 4-34*.

2. Type **%** to save the change in the database.

   You are prompted to confirm device reset. After the reset, APS is disabled in the database.

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>APS

  APS Group ID                          (L1L2)
 1. Protection                          (Yes)
 2. Revertive                           (No)
 3. Working Port                        (Link-1)
 4. Protection Port                     (Link-2)
 5. WTR (seconds) (1-720)               (60)
 6. Flip Upon SD                        (No)
>
%-Db Update; #-Undo; R-Remove
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-33. SDH/SONET APS Menu

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>APS




>
%-DB Update; #-Undo; A-Add
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-34. SDH/SONET APS Menu with APS not enabled

Table 4-7. SDH/SONET APS Parameters

Parameter	Description	Values
Protection	Defines whether APS is active. Can be used to temporarily disable APS but leave parameter values untouched.	**Yes** – Perform automatic protection switching **No** – Don't perform automatic protection switching
Revertive	Defines whether to switch back to the former Working Port if it is restored to service after a failure that caused a switch to the Protection Port	**Yes** – Revert to former Working Port **No** – Don't revert to former Working Port
Working Port	Defines which link is the primary link.	**Link-1** – SDH/SONET link 1 is primary port **Link-2** – SDH/SONET link 2 is primary port
Protection Port	Defines which link is the standby link	**Link-1** – SDH/SONET link 1 is standby port **Link-2** – SDH/SONET link 2 is standby port
WTR	Defines how long to wait before returning to former working port, if Revertive parameter is Yes	1 – 720 seconds
Flip Upon SD	Defines whether to switch to protection port in the event of signal degradation (SD)	**Yes** – Switch to protection port if SD occurs **No** – Do not switch to protection port if SD occurs

Configuring Fault Propagation

RICi-622GE allows the configuration of fault propagation per Ethernet interface and VCG. You can specify which Ethernet interface or VCG to shut down upon failure of a VCG or Ethernet interface.

➤ **To configure fault propagation:**

1. From the Fault Propagation menu (**Configuration** › **System** › **Fault Propagation**), type **a** to invoke Add mode.

2. In Add mode, add the desired Failed Interface and Affected Interface. Affected Interface specifies the VCG or Ethernet interface to shut down upon failure of the corresponding Failed Interface (Ethernet or VCG).

```
                          RICi-622GE
Configuration>System>Fault Propagation

Failed Interface                        Affected Interface
Eth 1                                          VCG
Eth 2                                          VCG
VCG                                            Eth 2

ESC-prev. menu; !-main menu; &-exit                      1 M/2 C
```

Figure 4-35. Fault Propagation Menu

Configuring the Logical Layer

The following parameters can be configured for the VCGs at the logical level:

- Administrative Status
- VC type and number
- LCAS
- Encapsulation
- VCAT.

The default logical layer configuration for RICi-622GE is one VCG containing four VCs of type VC-4 (SDH) or STS-3c (SONET), as shown in the following figures.

```
                          RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                 (VCG-1)
 2. Administrative Status               (Up)
 3. VC Type                             (VC-4)
 4. Number of VCs [1 – 8]               (4)
 5. Encapsulation                       (GFP)
 6. VCAT                                (Yes)
 7. VCG Name                            (Put your string here)
 8. GFP                                 >

>
ESC-prev. menu; !-main menu; &-exit                      1 M/2 C
```

Figure 4-36. VCG Menu Default Configuration, SDH

```
                              RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                  (VCG-1)
 2. Administrative Status                (Up)
 3. VC Type                              (STS-3C)
 4. Number of VCs [1 – 8]                (4)
 5. Encapsulation                        (GFP)
 6. VCAT                                 (Yes)
 7. VCG Name                             (Put your string here)
 8. GFP                                  >

>
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-37. VCG Menu Default Configuration, SONET

➤ To activate a VCG:

1. From the VCG menu (**Configuration** › **Logical Layer** › **VCAT**), type **f** to navigate to the screen for a non-active VCG.

   The VCG menu is displayed, showing a VCG with Administrative Status set to **Down**, and undefined VC type.

```
                              RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                  (VCG-2)
 2. Administrative Status                (Down)
 3. VC Type                              (-)
 4. Encapsulation                        (GFP)
 5. VCAT                                 (Yes)
 6. VCG Name  …                          (Put your string here)
 7. GFP                                  >

>

ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-38. VCG Menu for Non-active VCG

2. Select **Administrative Status** and set it to **Up** to activate the VCG.
3. Configure the rest of the parameters as desired, according to *Table 4-8*.
4. Type **%** to update the database with your changes.

Note *When you activate a VCG with VCs that have not been mapped, you receive a warning message when you update the database. After you set up mapping for the VCs in the VCGs, this message does not appear.*

➤ **To modify a VCG:**

1. Navigate to the VCG menu (**Configuration** > **Logical Layer** > **VCAT**).
2. Navigate to the VC that you wish to modify, by clicking **f**.
3. Configure the VCG parameters as detailed in *Table 4-8.*

➤ **To modify the GFP parameters of a VCG:**

1. From the VCG menu, select **GFP** to navigate to the GFP menu.
2. Configure the VCG GFP parameters as detailed in *Table 4-8.*

```
                          RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                (VCG-8)
 2. Administrative Status              (Up)
 3. VC Type                            (VC-4)
 4. LCAS                               (Yes)
 4. Number of VCs [1 – 8]              (3)
 5. Encapsulation                      (GFP)
 6. VCAT                               (No)
 7. Minimum Number of VCs              (2)
 8. VCG Name  …                        (VCG 8)
 9. GFP                                >

>
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-39. VCG Menu

Note *The VCG parameters shown in the menu differ according to the methods and protocols selected.*

```
                              RICi-622GE
Configuration>Logical Layer>VCG>GFP

 1. FCS                                    (Yes)
 2. Payload Scrambling                     (Yes)

>

ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-40. VCG GFP Menu

Table 4-8. VCG Parameters

Parameter	Description	Values
Administrative Status	Defines whether Virtual Concatenation Group (VCG) is available for operation.	**Up** – VCG is enabled **Down** – VCG is disabled
VC Type	Defines the Virtual Concatenation container type	SDH – **VC-3, VC-4, VC-4-4c** SONET – **STS-1**, **STS-3c**, **STS-12c**
LCAS	Defines whether Link Capacity Adjustment Scheme (LCAS) is enabled for VCG ***Note**: This parameter is visible only for VC types STS-1, STS-3c, VC-3, and VC-4, if there is more than one VC in the VCG and APS is not active.*	**Yes** – LCAS is enabled for VCG **No** – LCAS is disabled for VCG
Number of VCs	Defines number of VCs in the VCG	VC type VC-3 or STS-1: **1–24** VC type VC-4 or STS-3c: **1–8** VC type VC-4-4c or STS-12c: **1**
Encapsulation	Defines which encapsulation protocol is used for the VCG.	**GFP** – The Ethernet traffic is encapsulated using Generic Framing Procedure (GFP) protocol (ITU T G.7041, ANSI T1-105.02), framed mode **LAPS** – The Ethernet traffic is encapsulated using Link Access Procedure for SDH/SONET (LAPS) protocol following draft recommendation ITU-T X.86
VCAT	Defines whether Virtual Concatenation (VCAT) format is enabled for VCG.	**Yes** – VCAT is enabled for VCG **No** – VCAT is disabled for VCG
Minimum Number of VCs	Defines minimum number of VCs that must remain in operation. ***Note**: This parameter is visible only if LCAS is enabled.*	VC type VC-3 or STS-1: **1–24** VC type VC-4 or STS-3c: **1–8** VC type VC-4-4c or STS-12c: **1**
VCG Name	The name identifies the VCG.	Alphanumeric characters

Parameter	Description	Values
GFP	Opens GFP submenu This parameter is visible only if GFP is enabled for the VCG	

Table 4-9. VCG GFP Parameters

Parameter	Description	Values
FCS	Defines whether to calculate frame checksum	**Yes** – Calculate the frame checksum **No** – Do not calculate the frame checksum
Payload Scrambling	Defines whether to perform payload scrambling	**Yes** – Perform payload scrambling **No** – Do not perform payload scrambling

Configuring RICi-622GE at the Application Level

At the application level you can configure the following operation entities:

- Bridge port parameters
- Quality of Service (QoS)
- Flows.

If LAG is enabled for the Gigabit Ethernet ports, they are treated as one unit in the bridge port and flow menus, i.e. instead of screens for ports ETH-1 and ETH-2, there is one screen with LAG-1.

Configuring the Bridge Ports

RICi-622GE supports filtering of incoming traffic, accepting all frames or only those that have VLAN tags. The incoming frames can be assigned default VID and priority. The user traffic is mapped into separate flows using the configurable flow classification keys, and manipulated according to the defined marking and bandwidth profiles. In addition, for each port you can configure the ingress and MTU size.

➤ **To configure the bridge (user) port:**

1. From the Bridge menu (Configuration › Application › Bridge), select Bridge Port.

   The Bridge Port menu for the first Gigabit Ethernet port appears. Select **Forward** to advance to the second port if desired.

Note *If LAG is enabled, the Bridge Port menu appears with LAG-1 rather than with ETH-1 and ETH-2.*

2. From the Bridge Port menu, configure the parameters as detailed in *Table 4-10*.

```
                              RICi-622GE
Configuration>Application>Bridge>Bridge Port

    Bridge Port                          >    (ETH-1)

 1. Usage                                >    (User)
 2. Accept frame type                         (All)
 3. Flow Classification Mode                  (Flow-based)
 4. Flow Key                             >    (CE-VLAN ID)
 5. CoS Profile                          >    (DefaultCosPBits1)
 6. Default VID [1-4094]                 ...  (1)
 7. Default 802.1p [0-7]                 ...  (0)
 8. Ingress MTU [64-9600]                ...  (2048)
 9. L2CP Handling                        >
10. Egress Bandwidth profile             >
11. Loop detection                           (Disable)
>
F - Forward ;
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-41. Bridge User Port Configuration Menu, LAG Disabled

```
                              RICi-622GE
Configuration>Application>Bridge>Bridge Port

    Bridge Port                          >    (LAG-1)

 1. Usage                                >    (User)
 2. Accept frame type                         (All)
 3. Flow Classification Mode                  (Flow-based)
 4. Flow Key                             >    (CE-VLAN ID)
 5. CoS Profile                          >    (DefaultCosPBits1)
 6. Default VID [1-4094]                 ...  (1)
 7. Default 802.1p [0-7]                 ...  (0)
 8. Ingress MTU [64-9600]                ...  (2048)
 9. L2CP Handling                        >
10. Egress Bandwidth profile             >
>
F - Forward ;
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 4-42. Bridge User Port Configuration Menu, LAG Enabled

➤ To configure the network bridge ports:

1. From the Bridge Port menu, select **Forward** to advance to bridge ports VCG -1 through VCG-<n>, where n = 1–8, depending on how many active VCGs are defined.
2. From the Bridge Port menu, configure the parameters as detailed in *Table 4-10*.

```
                                RICi-622GE
Configuration>Application>Bridge>Bridge Port

    Bridge Port      >                        (VCG-1)
    Flow Classification Mode                  (Flow-based)

 1. Usage            >                    >   (Network)
 2. Accept frame type                         (All)
 3. Flow Key         >                    >   (SP-VLAN ID And 802.1p)
 4. CoS Profile      >                    >   (DefaultCosPBits1)
 5. Default VID [1-4094]                  ... (1)
 6. Default 802.1p [0-7]                  ... (0)
 7. SP Tag Protocol Identifier [0-FFFF]   ... (8100)
 8. Ingress MTU [64-9600]                 ... (2048)
 9. L2CP Handling    >                    >
10. Marking Profile  >                    >   (Marking1)
11. Egress Bandwidth profile              >
12. Loop detection                            (Disable)

>

F - Forward ;
ESC-prev. menu; !-main menu; &-exit                      1 M/2 C
```

Figure 4-43. Bridge Network Port Configuration Menu

Table 4-10. Bridge Port Parameters

Parameter	Description	Values
Usage	Defines if the port is network or user.	**Network** **User**
Flow Classification Mode	Selects the flow classification mode.	**All-To-One** – All ingress frames from the specified port are assigned to one flow **Flow-Based** – All ingress frames are mapped to a flow according to the configured flow key ***Note:*** *Flow classification mode must be Flow-Based if the port is a Gigabit Ethernet port being used to manage via management VLAN.*

Parameter	Description	Values
Flow Key	Determines which field is used by the classifier for the flow mapping. This parameter is present only if flow classification mode is flow-based.	**SP-VLAN ID** – Ingress frames are classified according to their Service Provider (SP) VLAN ID **SP-VLAN and 802.1p** – Ingress frames are classified according to their Service Provider (SP) VLAN ID and P-bit values **CE-VLAN ID** – Ingress frames are classified according to their Customer Edge (CE) VLAN ID **CE-802.1p** – Ingress frames are classified according to their Customer Edge (CE) VLAN P-bit value
Note: *SP-VLAN ID/SP-VLAN and 802.1p parameters are relevant for only the network ports. CE-VLAN ID and CE-802.1p parameters are relevant for only the user ports.*		
CoS Profile	Binds the current port to a valid Class of Service profile	A valid CoS profile
Default VID	Specifies a default VLAN ID to be assigned to incoming frames that have no VLAN tags. This parameter is relevant when the flow key is set to SP-VLAN, SP-VLAN and 802.1p, or CE-VLAN ID.	1–4094
Default 802.1p	Specifies a default 802.1p value to be assigned to the incoming frames that have no VLAN tags. This parameter is relevant when the flow key is set to SP-VLAN and 802.1p or CE-802.1p. It is also used for the CoS mapping, when the Ingress Priority Method is 802.1p and a frame arrives without a VLAN tag.	0–7
SP Tag Protocol Identifier	Determines the tag protocol identifier.	0–FFFF
Ingress MTU	Defines the maximum transmission unit (MTU) for ingress frames. Frames above this size are discarded.	64–2048 (Fast Ethernet traffic) 64–9600 (Gigabit Ethernet traffic)
Loop detection	Defines whether loop detection is performed	**Enable** **Disable** This parameter is not available if LAG is enabled. ***Note****: Loop detection frames are sent with the host VLAN ID.*
Marking Profile	Binds the current port to a valid marking profile	A valid marking profile

➤ To configure Layer 2 control protocol handling for user or network port:

1. From the Bridge Port menu, select **L2CP Handling.**

   The L2CP Handling menu appears.

2. Select the item that you wish to change, and toggle between **Tunnel** and **Discard** to specify how RICi-622GE processes layer 2 control protocol traffic:
   - **Tunnel** – L2CP frames are forwarded across the network as ordinary data
   - **Discard** – L2CP frames are discarded.

```
                          RICi-622GE
Configuration>Application>Bridge>Bridge Port> L2CP Handling

    MAC Dest Address                      Handling
 1. 01:80:C2:00:00:00                     (Tunnel)
 2. 01:80:C2:00:00:01                     (Tunnel)
 3. 01:80:C2:00:00:02                     (Tunnel)
 4. 01:80:C2:00:00:03                     (Tunnel)
 5. 01:80:C2:00:00:04                     (Tunnel)
 6. 01:80:C2:00:00:05                     (Tunnel)
 7. 01:80:C2:00:00:06                     (Tunnel)
 8. 01:80:C2:00:00:07                     (Tunnel)
 9. 01:80:C2:00:00:08                     (Tunnel)
10. 01:80:C2:00:00:09                     (Tunnel)
11. 01:80:C2:00:00:0A                     (Tunnel)
12. 01:80:C2:00:00:0B                     (Tunnel)
... (N)
>

Please select item <1 to 16>
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-44. L2CP Handling Menu

➤ To configure the bridge port egress bandwidth profile for user or network port:

1. From the Bridge Port menu, select **Egress Bandwidth Profile.**

   The Egress Bandwidth Profile menu appears.

2. From the Egress Bandwidth Profile menu, configure the parameters as detailed in *Table 4-11*.

```
                              RICi-622GE
Configuration>Application>Bridge>Bridge Port>Egress Bandwidth
Profile

 1. Cos [0 – 3]                              …       (0)
 2. Egress Rate Limit [Kbps] [0 – 1000000]       (1000000)
 3. Egress Burst Size [Bytes] [2048  - 32000]    (2048)
>



ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-45. Egress Bandwidth Profile Menu

Table 4-11. Egress Bandwidth Profile Parameters

Parameter	Description	Values
Cos	Links profile to a class of service.	A valid class of service from 0 (lowest priority)to 3 (highest priority).
Egress Rate Limit	Defines the shaper data rate limit.	0 – 1,000,000 kbps
Egress Burst Size	Defines the egress burst size for the traffic shaper. The shaper transmits a burst that is no longer than the configured burst size plus one frame. When the egress burst size is set to 0, the shaper provides equal interframe spacing regardless of the configured egress rate limit.	2048 – 32,000 Bytes

Configuring the Quality of Service (QoS)

The RICi-622GE Quality of Service (QoS) parameters include the following profiles:

- Class of Service (CoS)
- Marking
- Bandwidth.

These profiles are applied to the traffic flows to ensure the desired flow classification and prioritization.

Creating a CoS Profile

CoS profiles are used to convert user priority (P-bit) into internal priority queues (classes of service). RICi-622GE has two predefined CoS profiles:

- UserCosPbits – The ingress traffic is prioritized according to the 802.1p requirements, user ports only
- NetworksCosPbits – The ingress traffic is prioritized according to the 802.1p requirements, network ports only.

For each profile the user has to define the CoS mapping to map the user priority values to the internal CoS values.

➤ **To configure the CoS mapping for the 802.1p method:**

1. From the CoS profiles menu (Configuration › Application › QoS › CoS Profiles), select the UserCosPbits or NetworksCosPbits profile.
2. Select **CoS Mapping**.

   The CoS Mapping menu is displayed (*Figure 4-46*).
3. From the CoS Mapping menu, select a user priority tag value and map it to a priority queue (0–3).

```
                                RICi-622GE
Configuration>Application>QoS>CoS Profiles>CoS Mapping

   802.1p                    CoS


1. Tag Value 0 [0-3]         (0)
2. Tag Value 1 [0-3]         (0)
3. Tag Value 2 [0-3]         (1)
4. Tag Value 3 [0-3]         (1)
5. Tag Value 4 [0-3]         (2)
6. Tag Value 5 [0-3]         (2)
7. Tag Value 6 [0-3]         (3)
8. Tag Value 7 [0-3]         (3)

>

ESC-prev.menu; !-main menu; &-exit                                1 M/2 C
```

Figure 4-46. CoS Mapping Menu (802.1p Method)

Defining Marking Profiles

The marking profiles map the internal CoS queues to the egress priority tags.

➤ **To define a marking profile:**

- From the Marking menu (**Configuration** › **Application** › **QoS** › **Marking Profiles** › **Marking**), map each CoS value to a priority tag (0–7) to be assigned to traffic leaving the corresponding internal priority queue.

```
                                    RICi-622GE
Configuration>Application>QoS>Marking Profiles>Marking

   CoS                                Marking
1. CoS Value 0 [0-7]                  0
2. CoS Value 1 [0-7]                  1
3. CoS Value 2 [0-7]                  2
4. CoS Value 3 [0-7]                  3
5. CoS Value 0 for Yellow [0-7]       4
6. CoS Value 1 for Yellow [0-7]       5
7. CoS Value 2 for Yellow [0-7]       6
8. CoS Value 3 for Yellow [0-7]       7

>
Please select item <1 to 8>
ESC-prev.menu; !-main menu; &-exit                                1 M/2 C
```

Figure 4-47. Marking Menu

Defining the Bandwidth Profiles

RICi-622GE supports up to 64 bandwidth profiles that can be applied to the ingress traffic flows. RICi-622GE controls the bandwidth utilization by defining committed/excessive information rate and committed/excessive burst size.

➤ To define a bandwidth profile:

1. From the Bandwidth Profiles menu (**Configuration** › **Application** › **QoS** › **Bandwidth Profiles**), type **a** to add a new profile or type **f** to select an existing one (*Figure 4-48*).
2. Configure the bandwidth profile parameters as detailed in *Table 4-12*.

```
                                RICi-622GE
Configuration>Application>QoS>Bandwidth Profiles

1. Profile ID[1 - 64]                          ...    (1)
2. Profile Name                                ...    (Profile1)
3. CIR (Kbps)[0 - 1000000]                     ...    (1000000)
4. CBS (Bytes)[0 - 32000]                      ...    (32000)
5. EIR (Kbps)[0 - 1000000]                     ...    (0)
6. EBS (Bytes)[0 - 32000]                      ...    (0)
   Policed Traffic                                    (All)
   Color Mode                                         (Blind)
   Coupling Flag                                      (Disable)

>
Please select item <1 to 6>
A - Add New Profile ; F - Forward ; D - Delete
ESC-prev.menu; !-main menu; &-exit                                1 M/2 C
```

Figure 4-48. Bandwidth Profiles Menu

Table 4-12. Bandwidth Profile Parameters

Parameter	Function	Values
Profile ID	Defines the bandwidth profile identification number	1 – 64
Profile Name	Assigns a name to the bandwidth profile	Alphanumeric string of up to 20 characters
CIR	Defines the Committed Information Rate (CIR) for the current profile. The CIR specifies a bandwidth with committed service guarantee (“green bucket” rate).	0 – 1,000,000 kbps
CBS	Defines the Committed Burst Size (CBS) for the current profile. The CBS specifies the maximum guaranteed burst size (“green bucket” size).	0 – 32,000 bytes
EIR	Defines the Excess Information Rate (EIR). The EIR specifies an extra bandwidth that is allowed into the network, with no service guarantees (“yellow bucket” rate).	0 – 1,000,000 kbps
EBS	Defines the Excess Burst Size (EBS). The EBS specifies the extra burst that is allowed into the network, with no service guarantees (“yellow bucket” size).	0 – 32,000 bytes
Policed Traffic Type	Defines a packet type to which the rate/burst limitation is to be applied	Permanently set to **All** – The limitation is applied to all arriving packets

Parameter	Function	Values
Color Mode	Specifies if RICi-622GE takes into account the color of the frames assigned by the port mapping rules or if all frames are considered to be "green"	Permanently set to **Blind** – All frames are considered to be "green"
Coupling Flag	Determines if the allowed "yellow" frame rate is defined by the EIR or EIR+CIR value. Available only when the color mode is set to Aware.	Permanently set to **Disable** –The allowed "yellow" frame rate is defined by the EIR

Defining the Ethernet Flows

RICi-622GE supports up to 16 Ethernet flows that are used to provide E-line service delivery over Metro Ethernet networks. Each Ethernet flow connects a network and a user port. For each Ethernet flow, you must define:

- Flow members, depending on the selected port flow key (CE-VLAN ID, CE 802.1p, or SP-VLAN ID)
- Marking mode
- Ingress bandwidth profile
- Services or CoS.

Configuration parameters of existing flows cannot be changed. To change the configuration of an existing flow, delete it and redefine it with the required parameters.

Note *You cannot use a management VLAN in a user data flow.*

Adding an Ethernet Flow

➤ **To add an Ethernet flow:**

1. From the Flow menu (**Configuration** > **Application** > **Flows**), type **a** to add a flow.
2. Enter a new flow ID (1–16).
3. Select **Flow Name** and assign a name to the flow (alphanumeric string of up to 20 characters).
4. Select **Bridge Port List** to display the Bridge Port List menu and configure the bridge ports that serve the flow (see *Configuring the Flow Bridge Ports* section below).

```
                                RICi-622GE
Configuration>Application>Flows

1. Flow ID[1 - 16]              ... (1)
2. Flow Name                    ... (Atlanta)
3. Bridge Port List             >


>
Please select item <1 to 3>
A-Add New Flow; F-Forward ; B-Backward ; R-Remove

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-49. Flow Menu

Configuring the Flow Bridge Ports

1. From the Bridge Port List menu, select a network or user port to be configured.
2. Configure the bridge port parameters as detailed in *Table 4-13*.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Bridge Port                             (VCG-1)

1. SP VLAN[1 – 4094]                        (100)
2. Marking                                  (Fixed)
3. Marking Value                            (7)

>
Please select item <1 to 3>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-50. Bridge Port List Menu for Network Port

```
                                    RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 16]                          (1)


1. Bridge Port                                (ETH-1)
2. Mapping                                    >
3. Ingress BW Profile                         (Profile1)
4. Services                                   >
5. Fixed CoS [0 – 3]                          (0)
6. Egress VLAN Preservation Mode              (Preserve)

>
Please select item <1 to 6>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-51. Bridge Port List Menu for User Port, LAG Disabled

```
                                    RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 16]                          (1)


1. Bridge Port                                (LAG-1)
2. Mapping                                    >
3. Ingress BW Profile                         (Profile1)
4. Services                                   >
5. Fixed CoS [0 – 3]                          (0)
6. Egress VLAN Preservation Mode              (Preserve)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-52. Bridge Port List Menu for User Port, LAG Enabled

```
                                    RICi-622GE
Configuration>Application>Flows>Bridge Port List>Services

    Pbit                                        > (4)

1. Ingress BW Profile                             (Profile1)

>
Please select item <1 to 1>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                    1 M/2 C
```

Figure 4-53. Bridge Port List Services Menu

Table 4-13. Flow Bridge Port Parameters

Parameter	Description	Values
SP VLAN	Defines the SP VLAN tag to be added to the flow traffic on the egress from the network. This parameter is available for only the network ports.	1–4094
Mapping	Defines the flow members, depending on the selected port flow key. See *Defining the Flow Members* section below.	
Marking	Defines whether the flow priority is determined by the marking profile configured for the current port or by a fixed value	**Fixed** – Fixed priority value is added to the SP tag of the frames running on the flow **Profile** – The flow priority is determined by the marking profile configured for the current port
Marking Value	Specifies the priority value to be added to the SP tag of the frames running on the flow when the marking mode is Fixed	0–7
Ingress BW Profile	Defines an ingress bandwidth profile to be used by a CoS, that does not have a service assigned to it	

Parameter	Description	Values
Services	Defines mapping of ingress bandwidth profile to priority bits (Pbits). If you select Services, a menu opens that allows you to define an ingress bandwidth profile for one or more Pbits. If you assign at least one Pbit mapping, the Fixed CoS parameter does not appear in the Bridge Port List menu. Any Pbits that are not assigned an ingress bandwidth profile in the Services menu are mapped to the ingress bandwidth profile corresponding to the flow. ***Note**: This parameter is available only if flow key is CE-VLAN ID*	
Fixed CoS	Defines a specific CoS to use, rather than setting up mapping for the CoS Pbits	
Egress VLAN Preservation Mode	Defines what action to take with the CE VLAN ID at egress	**Preserve** – Leave CE VLAN ID unchanged **Remove** – Remove CE VLAN ID **Swap** – Replace CE VLAN ID with another VLAN ID **Add** – Add another VLAN ID to frame If **Swap** or **Add** is specified, the parameter Egress VLAN Swap/Add Value is added to the Bridge Ports List menu, to allow you to specify the VLAN ID to swap/add

Defining the Flow Members

When the flow classification mode is flow-based, it is necessary to add the flow members, which are defined according to one of the following methods (depending on the flow key type configured for the current port):

- CE-VLAN ID
- SP-VLAN ID
- CE-802.1p

➤ **To define the flow members:**

1. From the Mapping menu (**Configuration** > **Application** > **Flows** > **Bridge Port List** > **Mapping**), select CE-VLAN ID Members, SP-VLAN ID Members, or CE-802.1p Members, depending on the flow key type configured for the current bridge port. See *Configuring the Bridge Ports* above for instructions on how to configure a bridge port.

   The relevant menu is displayed. The menu has the permitted range of values, such as [1–4094] for CE-VLAN ID.

2. Type **a** to add a new flow member.
3. Enter a new member number or number range, such as 20–30.
4. Repeat steps *2*–*3* to add additional flow members.

5. Save the changes.

Note *If services are defined for the flow, you can add up to eight ranges. If fixed CoS is defined for the flow, you can add only one range.*

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List>Mapping(CE-VLAN-ID)

    Flow ID            …            (1)
    Bridge Port                     (ETH-1)

 1. Mapping Mode                    (User Mapping)
 2. CE-VLAN ID Members >            (6,7,10-100)


>
Please select item <1 to 4>
A-Add

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-54. Flow Mapping Menu for CE-VLAN-ID, LAG Disabled

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List>Mapping(CE-VLAN-ID)

    Flow ID            …            (1)
    Bridge Port                     (LAG-1)

 1. Mapping Mode                    (User Mapping)
 2. CE-VLAN ID Members >            (6,7,10-100)


>
Please select item <1 to 4>
A-Add

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-55. Flow Mapping Menu for CE-VLAN-ID, LAG Enabled

4.3 Additional Tasks

Configuring Date and Time

The Date and Time menu allows you to set the date and time of day in RICi-622GE, as well as to configure the NTP client parameters to receive the date and time from the network.

If NTP updates are being performed and the NTP server is properly configured and accessible, RICi-622GE displays the date and time received from the NTP server, instead of the configured date and time.

➤ **To set date and time:**

- From the Date and Time menu (**Configuration** › **System** › **Date & Time**), do the following to configure the date and time:
  - Select **Set date**, and enter the current date in the required format, as displayed on the screen.
  - Select **Set time**, and enter the current time in the required format, as displayed on the screen.

➤ **To set NTP client parameters:**

- From the Date and Time menu (**Configuration** › **System** › **Date & Time**), configure the NTP parameters as detailed in *Table 4-14*.

```
                          RICi-622GE
Configuration>System>Date & Time

 1. Date [DD-MM-YYYY]                ... (18-12-2007)
 2. Time [HH:MM:SS]                  ... (09:12:06)
 3. NTP Mode                         >   (Unicast Client)
 4. GMT                              >   (2)
 5. NTP Server IP Address            ... (172.17.163.93)
 6. NTP Update Interval (sec)        ... (5)
 7. Send Initiated NTP Request
>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-56. Date and Time Menu

Table 4-14. NTP Configuration Parameters

Parameter	Possible Values	Remarks
NTP Mode	Unicast Client Disable	If set to Unicast Client, date and time are received from NTP request that is periodically sent to NTP Server
GMT	-12 to 12	Offset from Greenwich Mean Time

Parameter	Possible Values	Remarks
NTP Server IP Address	0.0.0.0 to 255.255.255.255	Specifies the IP address of the NTP server from which to obtain the date and time
NTP Update Interval	0 to 4294967295	Time (in seconds) between NTP requests If set to 0, NTP updating is disabled
Send Initiated NTP Request	N/A	When this is selected, an NTP request is sent, regardless of the NTP update interval.

Viewing Inventory

The inventory menu allows you to view details of RICi-622GE hardware configuration, hardware revisions, and power supply type. You can display general inventory or detailed inventory, where you can select which details to display.

➤ **To display the RICi-622GE general inventory:**

- From the Inventory menu (**Main** > **Inventory**), select **General**.

  The General Inventory screen appears (see *Figure 4-58*).

➤ **To select which details to display in the RICi-622GE detailed inventory:**

- From the Inventory menu (**Main** > **Inventory**), select **Details Config**.

  The Inventory Details Config menu appears (see *Figure 4-59*). For each inventory detail, select **Enabled** to display it in detailed inventory, or **Disabled** to not display it.

➤ **To display the RICi-622GE detailed inventory:**

- From the Inventory menu (**Main** > **Inventory**), select **Details**.

  The Detailed Inventory screen appears, with the enabled details displayed (see *Figure 4-60*).

```
                                RICi-622GE
Inventory

1.  General                  []>
2.  Details Config           >
3.  Details                  []>

ESC-prev.menu; !-main menu; &-exit                              1 M/2 C
```

Figure 4-57. Inventory Menu

```
                                RICi-622GE
Inventory>General

Entity Name              HWRev           SWRev
Chassis                  1.0             1.00A1
FAN Module
Power Supply 1
Power Supply 2
Control Port
Eth mng Port
SDH/SONET port 1
SDH/SONET port 2
GBE port 1
GBE port 2

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-58. General Inventory Screen

```
                                RICi-622GE
Inventory>Details Config

1.        ID                > (Enabled)
2.        Description       > (Enabled)
3.        Vendor type       > (Enabled)
4.        Class             > (Enabled)
5.        Entity name       > (Enabled)
6.        HWRev             > (Enabled)
7.        FWRev             > (Enabled)
8.        SWRev             > (Enabled)
9.        Serial No         > (Enabled)
10.       Alias             > (Enabled)
11.       Asset ID          > (Enabled)
12.       FRU               > (Enabled)

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 4-59. Inventory Details Configuration Menu

```
                                                    RICi-622GE
Inventory>Details

ID      Description          Vendor Type    Contained in   Class   Relative Pos   Entity Name      HWRev   FWRev   SWRev
1001    RICI622GE                           0                      0              RICI622GE        1.0     0.0     1.00A1
1002    FAN Module                          1001                   8              FAN Module
1003    Power Supply 1                      1001                   5              Power Supply 1
1004    Power Supply 2                      1001                   0              Power Supply 2
1005    Control Port                        1001                   15             Control Port
1006    Eth mng Port                        1001                   16             Eth mng Port
1008    SDH/SONET Port 1                    1001                   1              SDH/SONET Port 1
1009    SDH/SONET Port 2                    1001                   2              SDH/SONET Port 2
1010    GBE Port 1                          1001                   3              GBE Port 1
1011    GBE Port 2                          1001                   4              GBE Port 2

ESC-prev.menu; !-main menu; &-exit
```

Figure 4-60. Detailed Inventory Screen with all Details Displayed, Left Side

```
                                                    RICi-622GE
Inventory>Details

Serial No    Mfg Name    Model Name          Alias                Asset ID          FRU
0.0          RAD         RICI622GE           Put your string      RICI622GE         True
0.0          RAD         FAN                 Put your string      FAN               False
                                             Put your string                        False
                                             Put your string                        False
0.0          RAD         Control Port        Put your string      Control Port      False
0.0          RAD         Management Port     Put your string      Management Port   False
0.0          RAD         Link Port           Put your string      Link Port         False
0.0          RAD         Link Port           Put your string      Link Port         False
0.0          RAD         Eth GBE Port        Put your string      Eth GBE Port      False
0.0          RAD         Eth GBE Port        Put your string      Eth GBE Port      False


                                                                                   1 M/2 C
```

Figure 4-61. Detailed Inventory Screen with all Details Displayed, Right Side

Transferring Software and Configuration Files

RICi-622GE allows you to download/upload files via TFTP.

➤ **To transfer files via TFTP:**

- From the File Transfer menu (**Utilities** › **File Utilities** › **File Transfer**), select **TFTP**.

  The TFTP menu is displayed (see *Figure 4-62*).

- From the TFTP menu, perform the following
  - Select **Server IP**, and enter IP address of TFTP server.
  - Define TFTP Total Timeout (TFTP connection timeout in seconds)
  - Select **Remote File Name**, and enter a file name:
    - For downloading, you specify the name of the file to be downloaded to RICi-622GE.
    - For uploading, you specify the name under which to save the file on the remote server.
  - Select **Command** to receive a submenu of commands, and select the desired procedure:
    - Software Download – Transfer a software file to RICi-622GE
    - Software Download and Reset – Transfer a software file to RICi-622GE and resetting the unit
    - Configuration Download – Transfer a configuration file to RICi-622GE
    - Configuration Upload – Save a configuration file on a remote server.

  RICi-622GE starts file transfer.

```
                          RICi-622GE
Utilities> File Utilities>File Transfer>TFTP

Transfer Status                          (Noop)
1.   Command                       >
2.   Remote File name                  (FILE.IMG)
3.   Server IP                         (0.0.0.0)
4.   TFTP Total timeout(ms)[60 - 240]  (60)

ESC-prev. menu; !-main menu; &-exit                  1 M/2 C
```

Figure 4-62. TFTP Menu

Resetting RICi-622GE

RICi-622GE supports the following types of reset:

- Reset all parameters to default settings

- Reset all parameters to default settings, except for management-related parameters
- Overall reset of the device.

Returning to Factory Defaults

The factory default option allows you to reset the system parameters to factory default values. You can reset all system parameters, or just the system parameters that are not related to management.

➤ **To return to factory default values:**

1. From the System menu (**Configuration** > **System**), select **Factory Default**.

   The Reset to Factory Default screen appears.

```
                          RICi-622GE
Configuration> System > Factory Default

 1. Full
 2. Except Management Connectivity Parameters

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 4-63. Factory Default Menu

2. Select which type of reset you would like:
   - Full reset of all parameters
   - Reset of parameters excluding management-related parameters.

   After you select the reset type, a confirmation message appears.

```
The device will restart. Do you want to proceed? (Y/N)
```

3. Type **Y** to confirm or **N** to cancel.

   If you type Y, the device is reset to factory default values as specified, and then reboots automatically.

Resetting the RICi-622GE Unit

RICi-622GE offers the option of performing an overall reset.

➤ **To reset RICi-622GE:**

1. From the **System** menu, select **Reset Device**.

   A confirmation message appears.

```
Are you sure you want to reset device (Y/N)?
```

2. Type **Y** to confirm or **N** to cancel.

   If you type Y, the device resets, and then reboots.

Chapter 5

Configuring Typical Applications

This chapter provides detailed instructions for setting up typical applications using RICi-622GE units. Refer to *Chapter 4* for a detailed description of all configuration options available for RICi-622GE.

5.1 Configuring a Point-to-Point Application

Figure 5-1 illustrates a point-to-point application of Ethernet private line over SDH/SONET.

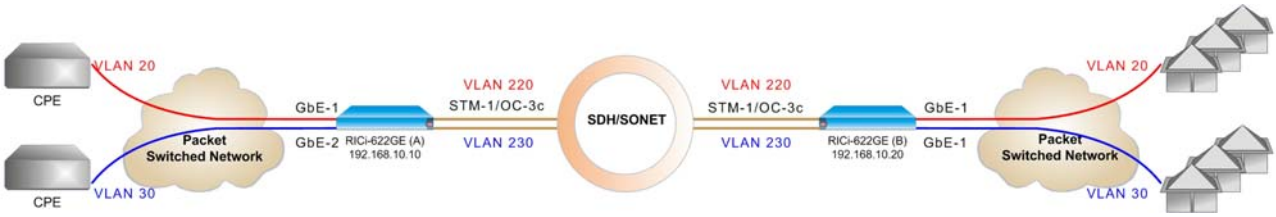


Figure 5-1. Point-to-Point Ethernet Private Line over SDH/SONET

In this application, RICi-622GE (A) receives Ethernet user traffic separated by VLAN at both Gigabit Ethernet user ports, and transmits it over separate VLANs through the SDH/SONET network. RICi-622GE (B) receives SDH/SONET user traffic separated by VLAN, and transmits it via one Gigabit Ethernet user port, separated by VLAN.

You must configure the following to deploy RICi-622GE units in this application:

1. System parameters (host IP, default gateway)
2. Bridge parameters
3. Flows.

Note *The default logical layer and mapping configuration of one VCG containing four VCs of type VC-4/STS-3c, each VC mapped to a separate VC-4/STS-3 of SDH/SONET link 1, is sufficient for this application.*

Table 5-1. System Configuration Summary, Point-to-Point Application

Device	Host IP	IP mask	Default Gateway
RICi-622GE (A)	192.168.10.10	255.255.255.0	192.168.10.1
RICi-622GE (B)	192.168.10.20	255.255.255.0	192.168.10.1

Table 5-2. Bridge Port Configuration Summary

Bridge Port	Flow Classification Mode
Gigabit Ethernet 1, RICi-622GE (A)	Flow-based
Gigabit Ethernet 2, RICi-622GE (A)	Flow-based
Gigabit Ethernet 1, RICi-622GE (B)	Flow-based

Table 5-3. Flow Configuration Summary, RICi-622GE (A)

Bridge Port	Flow ID	CE-VLAN-ID	Bridge Port	SP-VLAN-ID
Gigabit Ethernet 1	3	20	VCG	220
Gigabit Ethernet 2	4	30	VCG	230

Table 5-4. Flow Configuration Summary, RICi-622GE (B)

Bridge Port	Flow ID	CE-VLAN-ID	Bridge Port	SP-VLAN-ID
Gigabit Ethernet-1	3	20	VCG	220
Gigabit Ethernet-1	4	30	VCG	230

Configuring System Parameters

The configuration procedure for system parameters is similar for both RICi-622GE units, except for defining different host IP addresses. Refer to *Chapter 3* for an explanation of how to select management options and save the changes.

➤ **To configure the host parameters:**

- Display the Host menu (**Configuration› System ›Management› Host**), and configure the host parameters as shown in *Table 5-1*.

```
                          RICi-622GE
Configuration>System>Management>Host

 1. IP address                    ... (192.168.10.10)
 2. IP mask                       ... (255.255.255.0)
 3. Default Gateway               ... (192.168.10.1)
 4. Read community                ... (public)
 5. Write community               ... (public)
 6. Trap community                ... (public)
 7. Encapsulation                     >

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 5-2. Configuring Host Parameters for RICi-622GE (A), Point-to-Point Application

Configuring Bridge Ports

The bridge port configuration procedure is similar for the Gigabit Ethernet bridge ports in both RICi-622GE units. You must configure the bridge ports as shown in *Table 5-1*.

➤ **To configure the Gigabit Ethernet ports:**

1. From the Bridge Port menu (**Configuration** › **Application** › **Bridge** › **Bridge Port**), select the first Gigabit Ethernet port of RICi-622GE (A).
2. From the Bridge Port Parameters menu, set flow classification mode to flow-based.
3. From the Bridge Port Parameters menu, set flow key to **CE-VLAN-ID**.
4. From the Bridge Port Parameters menu, set CoS Profile to **DefaultCosPBits1**.
5. Perform steps *2* through *4* for the second Gigabit Ethernet port of RICi-622GE (A), and for the first Gigabit Ethernet port of RICi-622GE (B).

```
                              RICi-622GE
Configuration>Application>Bridge>Bridge Port

    Bridge Port                          >    (ETH-1)

 1. Usage                                >    (User)
 2. Accept frame type                         (All)
 3. Flow Classification Mode                  (Flow-based)
 4. Flow Key                             >    (CE-VLAN ID)
 5. CoS Profile                          >    (DefaultCosPBits1)
 6. Default VID [1-4094]                 ...  (1)
 7. Default 802.1p [0-7]                 ...  (0)
 8. Ingress MTU [64-9600]                ...  (2048)
 9. L2CP Handling                        >
10. Egress Bandwidth profile             >
11. Loop detection                           (Disable)
>
F - Forward ;
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 5-3. Configuring Bridge User Port

Configuring the Flows

In RICi-622GE (A), you must configure a flow for each Gigabit Ethernet port, with CE VLAN and SP VLAN memberships as shown in *Table 5-3*. In RICi-622GE (B), you must configure two flows for one Gigabit Ethernet port, with CE VLAN and SP VLAN memberships as shown in *Table 5-4*.

Configuring flows in RICi-622GE (A)

➤ To configure flow 3 in RICi-622GE (A):

1. From the Flow menu (**Configuration** › **Application** › **Flows**), type **a** to add a flow.
2. Enter flow ID **3**.
3. Select **Flow Name** and assign a name to the flow (alphanumeric string of up to 20 characters).

```
                                RICi-622GE
Configuration>Application>Flows

1. Flow ID[1 - 16]              ... (3)
2. Flow Name                    ... (GbE-1 A)
3. Bridge Port List             >

>
Please select item <1 to 3>
A-Add New Flow; F-Forward ; B-Backward ; R-Remove

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-4. Configuring Flow 3, RICi-622GE (A)

4. Select **Bridge Port List** to display the Bridge Port List menu.
5. From the Bridge Port List menu, select the first Gigabit Ethernet port.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 32]                          ... (3)

1. Bridge Port                                >   (ETH-1)
2. Mapping                                    >
3. Ingress BW Profile                         >   (Profile1)
4. Services                                   >
5. Fixed CoS [0 – 3]                        ...   (0)
6. Egress VLAN Preservation Mode              >   (Preserve)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-5. Flow Bridge Port GbE-1

6. Select **Mapping** to display the mapping menu.

7. From the Mapping menu, select **Mapping Mode** and set it to **User Mapping** if it is not already set to **User Mapping**.
8. Select **CE-VLAN ID Members** and add **20** as a member.
9. Save your changes.
10. Click **<ESC>** to go to the Mapping menu.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List>Mapping(CE-VLAN-ID)

    Flow ID            …            (3)
    Bridge Port                     (ETH-1)

 1. Mapping Mode                    (User Mapping)
 2. CE-VLAN ID Members >            (20)

>
Please select item <1 to 4>
A-Add

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-6. Flow Mapping for GbE-1 of RICi-622GE (A)

11. Click **<ESC>** to go to the Bridge Port List menu.
12. Select VCG-1 as the Bridge Port.
13. Select **SP VLAN**, and add **220** as a member.
14. Save your changes.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 16]                        (3)

1. Bridge Port                                (VCG-1)
2. SP VLAN [1 – 4095]                       > (220)
3. Marking                                   > (Profile)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-7. Flow Bridge Port VCG-1

➤ **To configure flow 4 in RICi-622GE (A):**

1. From the Flow menu (**Configuration** > **Application** > **Flows**), type **a** to add a flow.

2. Enter flow ID **4**.
3. Select **Flow Name** and assign a name to the flow (alphanumeric string of up to 20 characters).
4. Select **Bridge Port List** to display the Bridge Port List menu.

```
                                RICi-622GE
Configuration>Application>Flows

1. Flow ID[1 - 16]              ... (4)
2. Flow Name                    ... (GbE-2 A)
3. Bridge Port List             >


>
Please select item <1 to 3>
A-Add New Flow; F-Forward ; B-Backward ; R-Remove

ESC-prev.menu; !-main menu; &-exit                              1 M/2 C
```

Figure 5-8. Configuring Flow 4, RICi-622GE (A)

5. From the Bridge Port List menu, select the second Gigabit Ethernet port.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 16]                          ... (4)

1. Bridge Port                                >   (ETH-2)
2. Mapping                                    >
3. Ingress BW Profile                         >   (Profile1)
4. Services                                   >
5. Fixed CoS [0 – 3]                        ...   (0)
6. Egress VLAN Preservation Mode              >   (Preserve)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                              1 M/2 C
```

Figure 5-9. Flow Bridge Port GbE-1

6. Select **Mapping** to display the mapping menu.
7. From the Mapping menu, select **Mapping Mode** and set it to **User Mapping**.
8. Select **CE-VLAN ID Members** and add **30** as a member.
9. Save your changes.
10. Click **<ESC>** to go to the Mapping menu.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List>Mapping(CE-VLAN-ID)

    Flow ID            …            (4)
    Bridge Port                     (ETH-2)

 1. Mapping Mode                    (User Mapping)
 2. CE-VLAN ID Members >            (30)

>
Please select item <1 to 4>
A-Add
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-10. Flow Mapping for GbE-2 of RICi-622GE (A)

11. Click ‹ESC› to go to the Bridge Port List menu.
12. Select VCG-1 as the Bridge Port.
13. Select SP VLAN, and add 230 as a member.
14. Save your changes.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 32]                        (4)

1. Bridge Port                                (VCG-1)
2. SP VLAN [1 – 4095]                       > (230)
3. Marking                                   > (Profile)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-11. Flow Bridge Port VCG-1

Configuring flows in RICi-622GE (B)

➤ To configure flow 3 in RICi-622GE (B):

1. From the Flow menu (Configuration › Application › Flows), type a to add a flow.
2. Enter flow ID 3.
3. Select Flow Name and assign a name to the flow (alphanumeric string of up to 20 characters).

```
                                RICi-622GE
Configuration>Application>Flows

1. Flow ID[1 - 16]              ... (3)
2. Flow Name                    ... (GbE-1 B1)
3. Bridge Port List             >

>
Please select item <1 to 3>
A-Add New Flow; F-Forward ; B-Backward ; R-Remove

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-12. Configuring Flow 3, RICi-622GE (B)

4. Select **Bridge Port List** to display the Bridge Port List menu.
5. From the Bridge Port List menu, select the first Gigabit Ethernet port.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 32]                        (3)

1. Bridge Port                              (ETH-1)
2. Mapping                                  >
3. Ingress BW Profile                       (Profile1)
4. Services                                 >
5. Fixed CoS [0 – 3]                        (0)
6. Egress VLAN Preservation Mode            (Preserve)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-13. Flow Bridge Port GbE-1

6. Select **Mapping** to display the mapping menu.
7. From the Mapping menu, select **Mapping Mode** and set it to **User Mapping**.
8. Select **CE-VLAN ID Members** and add **20** as a member.
9. Save your changes.
10. Click **<ESC>** to go to the Mapping menu.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List>Mapping(CE-VLAN-ID)

    Flow ID            …          (3)
    Bridge Port                   (ETH-1)

 1. Mapping Mode                  (User Mapping)
 2. CE-VLAN ID Members >          (20)

>
Please select item <1 to 4>
A-Add

ESC-prev.menu; !-main menu; &-exit                                1 M/2 C
```

Figure 5-14. Flow Mapping for GbE-1 of RICi-622GE (B)

11. Click **<ESC>** to go to the Bridge Port List menu.
12. Select VCG-1 as the Bridge Port.
13. Select **SP VLAN**, and add **220** as a member.
14. Save your changes.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 32]                        (3)

1. Bridge Port                                (VCG-1)
2. SP VLAN [1 – 4095]                       > (220)
3. Marking                                   > (Profile)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                1 M/2 C
```

Figure 5-15. Flow Bridge Port VCG-1

➤ **To configure flow 4 in RICi-622GE (B):**

1. From the Flow menu (**Configuration** › **Application** › **Flows**), type **a** to add a flow.
2. Enter flow ID **4**.
3. Select **Flow Name** and assign a name to the flow (alphanumeric string of up to 20 characters).
4. Select **Bridge Port List** to display the Bridge Port List menu.

```
                                RICi-622GE
Configuration>Application>Flows

1. Flow ID[1 - 16]              ... (4)
2. Flow Name                    ... (GbE-1 B2)
3. Bridge Port List             >


>
Please select item <1 to 3>
A-Add New Flow; F-Forward ; B-Backward ; R-Remove

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-16. Configuring Flow 4, RICi-622GE (B)

5. From the Bridge Port List menu, select the first Gigabit Ethernet port.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 32]                        (4)

1. Bridge Port                              (ETH-1)
2. Mapping                                  >
3. Ingress BW Profile                       (Profile1)
4. Services                                 >
5. Fixed CoS [0 – 3]                        (0)
6. Egress VLAN Preservation Mode            (Preserve)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-17. Flow Bridge Port GbE-1

6. Select **Mapping** to display the mapping menu.
7. From the Mapping menu, select **Mapping Mode** and set it to **User Mapping**.
8. Select **CE-VLAN ID Members** and add **30** as a member.
9. Save your changes.
10. Click **<ESC>** to go to the Mapping menu.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List>Mapping(CE-VLAN-ID)

    Flow ID            …            (4)
    Bridge Port                     (ETH-1)

 1. Mapping Mode                    (User Mapping)
 2. CE-VLAN ID Members >            (30)

>
Please select item <1 to 4>
A-Add
ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-18. Flow Mapping for GbE-1 of RICi-622GE (B)

11. Click ‹ESC› to go to the Bridge Port List menu.
12. Select VCG-1 as the Bridge Port.
13. Select SP VLAN, and add 230 as a member.
14. Save your changes.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 32]                        (4)

1. Bridge Port                               (VCG-1)
2. SP VLAN [1 – 4095]                       > (230)
3. Marking                                   > (Profile)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-19. Flow Bridge Port VCG-1

5.2 Configuring a Traffic Aggregation Application

Figure 5-20 illustrates an application where RICi-622GE aggregates traffic from four RICi-155GE units. This section describes the necessary configuration of RICi-622GE, assuming that you are starting with the default configuration.

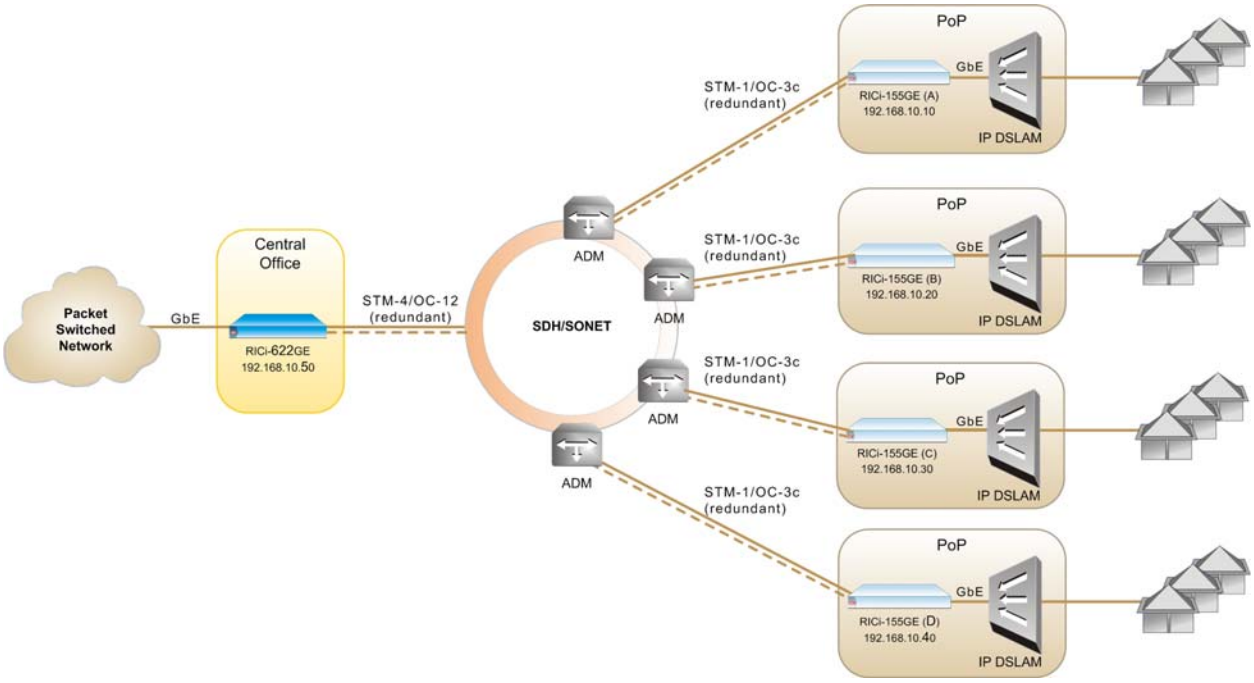


Figure 5-20. Traffic Aggregation

You must configure the following to deploy RICi-622GE in this application:

1. System parameters (host IP, default gateway)
2. Link Aggregation for the Ethernet ports
3. Logical layer
4. SONET link mapping
5. Flows.

Note *The default bridge port configuration is sufficient for this application, therefore no bridge port configuration is necessary.*

The necessary VCG configuration and SONET link mapping is shown in the following figure. RICi-622GE uses a separate VCG for each remote RICi-155GE unit.

```
          STS1-1          STS1-2                STS1-3
STS3-1    [          VCG1 (STS-3c, 1 VC)        ]
STS3-2    [          VCG2 (STS-3c, 1 VC)        ]
STS3-3    [          VCG3 (STS-3c, 1 VC)        ]
STS3-4    [          VCG4 (STS-3c, 1 VC)        ]
```

Figure 5-21. VCG to SONET Link Mapping

The necessary flow configuration is shown in the following table. A separate flow must be configured for each remote RICi-155GE unit.

Table 5-5. Flow Configuration Summary, Aggregation Application

Remote Unit	Flow ID	Bridge Port	CE-VLAN-ID	Bridge Port	SP-VLAN-ID
RICi-155GE (A)	3	LAG-1	1000–1500	VCG-1	200
RICi-155GE (B)	4	LAG-1	1501–2000	VCG-2	300
RICi-155GE (C)	5	LAG-1	2001–2500	VCG-3	400
RICi-155GE (D)	6	LAG-1	2501–3000	VCG-4	500

Configuring System Parameters

➤ **To configure the host parameters:**

- Display the Host menu (**Main› Configuration› System › Host**), and configure the host parameters as shown below.

```
                          RICi-622GE
Configuration>System>Management>Host

 1. IP address                    ... (192.168.10.50)
 2. IP mask                       ... (255.255.255.0)
 3. Default Gateway               ... (192.168.10.1)
 4. Read community                ... (public)
 5. Write community               ... (public)
 6. Trap community                ... (public)
 7. Encapsulation                     >

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 5-22. Configuring Host IP Parameters for RICi-622GE, Multipoint Application

Configuring Ethernet Link Aggregation

You must configure link aggregation for the Gigabit Ethernet ports.

To configure the Gigabit Ethernet link aggregation:

1. Navigate to the LAG menu (**Configuration › Physical Layer › LAG**).

   The LAG menu appears, indicating the Link Aggregation status is disabled.

```
                              RICi-622GE
Configuration>Physical layer>LAG

1. LAG Enable                          > (Disable)

>
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 5-23. LAG Menu, LAG Disabled

2. From the LAG menu, select **LAG Enable** and set it to **Enable**.

```
                              RICi-622GE
Configuration>Physical layer>LAG

LAG Is Active On ETH1-ETH2!
 1. LAG Enable                         > (Enable)

>
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 5-24. LAG Menu, LAG Enabled

3. Type **%** to update the database with your change.

   A confirmation message appears.

```
Are you sure you want to update configuration? (Y/N)
```

4. Type **Y** to confirm.

   The change to the link aggregation status is applied.

Configuring Logical Layer

You must configure VCG-1 through VCG-4 with VC type STS-3c, each containing one VC, as shown in *Figure 5-21*.

➤ **To configure the VCGs:**

1. Navigate to the VCG menu (**Configuration > Logical Layer > VCAT**).

   The VCG menu appears, showing VCG-1 in the default configuration.

```
                              RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                  (VCG-1)
 2. Administrative Status                (Up)
 3. VC Type                              (STS-3C)
 4. LCAS                                 (No)
 5. Number of VCs [1 – 8]                (4)
 6. Encapsulation                        (GFP)
 7. VCAT                                 (Yes)
 8. VCG Name  …                          (Put your string here)
 9. GFP                                  >

>
F-Forw
ESC-prev. menu; !-main menu; &-exit                      1 M/2 C
```

Figure 5-25. VCG-1 Default

2. Configure VCG-1 to have one VC, as shown below.

```
                              RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                  (VCG-1)
 2. Administrative Status                (Up)
 3. VC Type                              (STS-3C)
 4. LCAS                                 (No)
 5. Number of VCs [1 – 8]                (1)
 6. Encapsulation                        (GFP)
 7. VCAT                                 (Yes)
 8. VCG Name  …                          (Put your string here)
 9. GFP                                  >

>
F-Forw
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 5-26. VCG-1 Configuration

3. Type **f** to navigate to VCG-2.

   The VCG menu is displayed, showing VCG-2 with Administrative Status set to **Down**, and undefined VC type.

```
                              RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                  (VCG-2)
 2. Administrative Status                (Down)
 3. VC Type                              (-)
 4. Encapsulation                        (GFP)
 5. VCAT                                 (Yes)
 6. VCG Name  …                          (Put your string here)
 7. GFP                                  >

>

ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 5-27. VCG Menu for New VCG

4. Configure VCG-2 to have VC type STS-3c with one VC, as shown below. .

```
                              RICi-622GE
Configuration>Logical Layer>VCAT

 1. VCG                                    (VCG-2)
 2. Administrative Status                  (Up)
 3. VC Type                                (STS-3C)
 4. LCAS                                   (No)
 5. Number of VCs [1 – 8]                  (1)
 6. Encapsulation                          (GFP)
 7. VCAT                                   (Yes)
 8. VCG Name  …                            (Put your string here)
 9. GFP                                    >

>
%-Db Update; #-Undo; F-Forw
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 5-28. VCG-2

5. Use the same procedure to configure VCG-3 and VCG-4.
6. Type **%** to update the database with your changes.

Configuring SDH/SONET Mapping

➤ **To configure the SDH/SONET mapping:**

1. Navigate to the SDH/SONET mapping menu for Link 1 (**Configuration>Physical layer>SDH/SONET>Mapping>Link 1**).

   The mapping menu appears, showing the default configuration.

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

              STS1-1      STS1-2        STS1-3
STS3-1          [           VCG1            ]
STS3-2          [           VCG1            ]
STS3-3          [           VCG1            ]
STS3-4          [           VCG1            ]

1. None
2. VCG1
3. VCG2
4. VCG3
5. VCG4

>

ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 5-29. Default SONET Mapping

2. Position the cursor over the **VCG1** entry in the **STS3-2** row, and type **1** and then ‹**Enter**› to remove the VCG-1 mapping.

   The VCG-1 mapping in the **STS3-2** row is removed as shown below.

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

              STS1-1      STS1-2        STS1-3
STS3-1          [           VCG1            ]
STS3-2         None        None           None
STS3-3          [           VCG1            ]
STS3-4          [           VCG1            ]

1. None
2. VCG1
3. VCG2
4. VCG3
5. VCG4

>

%-Db Update; #-Undo
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 5-30. SONET Mapping

3. Type **3** and then ‹**Enter**› to map VCG-2 in the **STS3-2** row.

The VCG-2 mapping is added as shown below.

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

               STS1-1     STS1-2        STS1-3
STS3-1          [          VCG1             ]
STS3-2          [          VCG2             ]
STS3-3          [          VCG1             ]
STS3-4          [          VCG1             ]

1. None
2. VCG1
3. VCG2
4. VCG3
5. VCG4

>

%-Db Update; #-Undo
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 5-31. SONET Mapping

4. Perform the same procedure to map VCG-3 in the **STS3-3** row, and VCG-4 in the **STS3-4** row. The completed mapping is shown below.

```
                              RICi-622GE
Configuration>Physical layer>SDH/SONET>Mapping>Link 1

               STS1-1     STS1-2        STS1-3
STS3-1          [          VCG1             ]
STS3-2          [          VCG2             ]
STS3-3          [          VCG3             ]
STS3-4          [          VCG4             ]

1. None
2. VCG1
3. VCG2
4. VCG3
5. VCG4

>

%-Db Update; #-Undo
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 5-32. VCG SONET Mapping, Completed

5. Type **%** to update the database with your changes.

Configuring the Flows

You must configure a flow for each remote RICi-155GE unit, as shown in *Table 5-5*.

➤ **To configure the flows:**

1. From the Flow menu (**Configuration** › **Application** › **Flows**), type **a** to add a flow.
2. Enter flow ID **3**.
3. Select **Flow Name** and assign a name to the flow (alphanumeric string of up to 20 characters).

```
                                RICi-622GE
Configuration>Application>Flows

1. Flow ID[1 - 16]              ... (3)
2. Flow Name                    ... (RICi-155GE A)
3. Bridge Port List             >

>
Please select item <1 to 3>
A-Add New Flow; F-Forward ; B-Backward ; R-Remove

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-33. Configuring Flow 1

4. Select **Bridge Port List** to display the Bridge Port List menu.
5. From the Bridge Port List menu, select **LAG-1**.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 16]                          ... (3)

1. Bridge Port                                >   (LAG-1)
2. Mapping                                    >
3. Ingress BW Profile                         >   (Profile1)
4. Services                                   >
5. Fixed CoS [0 – 3]                         ...  (0)
6. Egress VLAN Preservation Mode              >   (Preserve)

>
Please select item <1 to 4>
F-Forward

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-34. Flow with Bridge Port LAG-1

6. Select **Mapping** to display the mapping menu.
7. From the Mapping menu, select **Mapping Mode** and set it to **User Mapping**.
8. Select **CE-VLAN ID Members** and add the range **1000–1500**.
9. Save your changes.
10. Click **‹ESC›** to go to the Mapping menu.

```
                                RICi-622GE
Configuration>Application>Flows>Bridge Port List>Mapping(CE-VLAN-ID)

    Flow ID           …          (3)
    Bridge Port                  (LAG-1)

 1. Mapping Mode                 (User Mapping)
 2. CE-VLAN ID Members >         (1000–1500)

>
Please select item <1 to 4>
%-Db Update; #-Undo;

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-35. Flow Mapping for Flow 3, LAG-1

11. Click **‹ESC›** to go to the Bridge Port List menu.
12. Add a new bridge port: VCG-1.
13. Select **SP VLAN**, and add **200**.
14. Save your changes.

```
                                    RICi-622GE
Configuration>Application>Flows>Bridge Port List

    Flow ID [1 – 32]                              (3)

1. Bridge Port                                      (VCG-1)
2. SP VLAN [1 – 4095]                             > (200)
3. Marking                                         > (Profile)

>
Please select item <1 to 3>
%-Db Update; #-Undo; F-Forward; R-Remove

ESC-prev.menu; !-main menu; &-exit                                  1 M/2 C
```

Figure 5-36. Flow Bridge Port VCG-1

15. Repeat the same procedure for flows 4, 5, and 6, using the values shown in *Table 5-5*.

Chapter 6

Troubleshooting and Diagnostics

This chapter describes how to:

- Display system status
- View statistics
- Monitor performance
- Run diagnostic tests
- Perform connectivity tests.

6.1 Monitoring Performance

RICi-622GE allows you to monitor performance by viewing system status and statistics.

Viewing Physical Layer Status

Displaying Ethernet Status

RICi-622GE allows you to view the status of the Gigabit Ethernet ports at the physical level. You can view the status of the SFP or interface.

➤ **To display the Gigabit Ethernet SFP status:**

1. From the Monitoring Gigabit Ethernet menu (**Main** > **Monitoring** > **Physical Layer** > **Ethernet** > **Status**), select **SFP**.

   The Ethernet SFP status screen appears for the first Gigabit Ethernet port (see *Figure 6-1*).

Note *The SFP status is available only if the Ethernet ports use SFP interfaces.*

2. Type **f** to advance to the Ethernet SFP status screen for the next port.

```
                              RICi-622GE
Monitoring>Physical layer>Ethernet>Status>SFP

1.  Port Number                          >   (ETH-1)
    Connector Type                        >  (LC)
    Manufacturer Name                    >   (INFINEON)
    Typical Max. Range                   >   (15 km)
    Wave Length                          >   (1310nm)
    Fiber Type…                          ... (SM)
    TX Power (dBm)                       ... (0)
    RX Power (dBm)                       ... (0)
    Laser Bias (mA)                      ... (0)
    Laser Temperature(C)                 ... (0)

Please select item 1
F-Forwards; B-Backwards
ESC-prev.menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-1. Ethernet SFP Status Screen

➤ To display the Gigabit Ethernet port interface status:

1. From the Monitoring Gigabit Ethernet menu (**Main** › **Monitoring** › **Physical Layer** › **Ethernet** › **Status**), select **Interface**.

   The Ethernet Interface status screen appears (see *Figure 6-2*).

2. Type **f** to advance to the Ethernet Interface status screen for the next port.

```
                              RICi-622GE
Monitoring>Physical layer>Ethernet>Status>Interface

 1.  Port     >                       >  (ETH-1)
     Administrative Status           >  (Up)
     Operation Status                >  (Up)
     Auto Negotiation                >  (Completed)
     Speed & Duplex                  >  (1000Mbps Full Duplex)

Please select item 1
F-Forwards ; B-backwards
ESC-prev.menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-2. Ethernet Interface Status Screen

Displaying SDH/SONET Status

RICi-622GE allows you to view the status of the SDH/SONET ports at the physical level. You can view the status of the SFP, interface, or HVC.

➤ To display the SDH/SONET SFP status:

1. From the Monitoring SDH/SONET menu (**Main** › **Monitoring** › **Physical Layer** › **SDH/SONET** › **Status**), select **SFP**.

   The SDH/SONET SFP status screen appears (see *Figure 6-3*).

2. Type **f** to advance to the SDH/SONET SFP status screen for the next port.

```
                              RICi-622GE
Monitoring>Physical layer>SDH/SONET>Status>SFP

 1. Port      …                          > (Link-1)
    Connector Type                       > (SFPIN)
    Manufacturer Name                    > (FIBERXON INC.)
    Typical Max. Range (km)              > (0)
    Wave Range                           > (1550 nm)
    Fiber Type>                          > (MM)
    TX Power (dBm)                       > (0)
    RX Power (dBm)                       > (0)
    Laser Bias (mA)                      > (0)
    Laser Temperature(C)                 > (0)

Please select item <1 to 1>
F-Forward
ESC-prev.menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-3. SDH/SONET SFP Status Screen

➤ To display the SDH/SONET interface status:

1. From the Monitoring SDH/SONET menu (**Main** › **Monitoring** › **Physical Layer** › **SDH/SONET** › **Status**), select **Interface**.

   The SDH/SONET Interface status screen appears (see *Figure 6-4*).

2. Type **f** to advance to the SDH/SONET Interface status screen for the next port.

```
                              RICi-622GE
Monitoring>Physical layer>SDH/SONET>Status>Interface

 1.  Port     >                          (Link-1)
     Connector Type                    > (SFPIN)
     Administrative Status             > (Up)
     Operation Status                  > (Up)

Please select item <1 to 1>
F-Forward
ESC-prev.menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-4. SDH/SONET Interface Status Screen

➤ To display the SDH/SONET HVC status:

1. From the Monitoring SDH/SONET menu (**Main** › **Monitoring** › **Physical Layer** › **SDH/SONET** › **Status**), select **HVC**.

   The SDH/SONET HVC status screen appears (see *Figure 6-5*).

2. Type **f** to advance to the SDH/SONET HVC status screen for the next port.

```
                              RICi-622GE
Monitoring>Physical layer>SDH/SONET >Status>HVC

 1.  Link [1-2]                          > (1)
     VC-4\STS3 [1-4]                     > (01)

F-Forward
ESC-prev.menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-5. SDH/SONET HVC Status Screen

Displaying Automatic Protection Switching Status

RICi-622GE allows you to display the status of the Automatic Protection Switching, including which link is currently the active link, and the alarm that caused switchover.

➤ **To display the SDH/SONET APS status:**

- From the Monitoring SDH/SONET menu (**Main** › **Monitoring** › **Physical Layer** › **SDH/SONET** › **Status**), select APS.

  The SDH/SONET APS status screen appears (see *Figure 6-3*). The following are shown in the status screen:

  - Current Working Port – Specifies Link-1 or Link-2 as the current working port
  - RX K1K2 –Shows the K1/K2 bytes in the receive direction
  - TX K1K2 –Shows the K1/K2 bytes in the transmit direction.

  See *Figure 6-7* and *Figure 6-8* for a description of the layout of the K1 and K2 bytes.

```
                              RICi-622GE
Monitoring>Physical layer>SDH/SONET>Status>APS

 Current Working Port…                  > (Link-1)
 RX K1K2 (Hex) [0 – ffff]               > (0000)
 TX K1K2 (Hex) [0 – ffff]               > (D004)


ESC-prev.menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-6. SDH/SONET APS Status Screen

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Alarm that caused switchover Possible values (hexadecimal): **0** – No alarm **6** – Wait to restore **0A**– Signal degradation low priority **0B** – Signal degradation high priority **0C** – Signal failure low priority **0D** – Signal failure high priority **0E** – Forced switchover				Primary link as configured in **Configuration > Physical layer > SDH/SONET > APS** Possible values: **0** – Link-1 **1** – Link-2			

Figure 6-7. K1 Byte Layout

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Currently active link Possible values: **0** – Link-1 **1** – Link-2				Reserved for future use (always set to 4)			

Figure 6-8. K2 Byte Layout

Displaying Timing Source

RICi-622GE allows you to view the timing source reference.

➤ **To display the timing status:**

1. From the Monitoring Physical Layer menu (**Main** › **Monitoring** › **Physical Layer**), select **Timing**.

   The Timing status menu appears. *Table 6-1* details the timing parameters.

2. Select the port for which you wish to view the timing.

```
                          RICi-622GE
Monitoring>Physical layer>Timing

  Tx Clock Source                  >   (LINK 1)
  Port        >                    >   (INK 1)
  Rx SSM      >                    >   (UNKNOWN)
  Tx SSM      >                    >   (DNU)


ESC-prev.menu; !-main menu; &-exit                    1 M/2 C
```

Figure 6-9. Timing Status Menu

Table 6-1. Timing Parameters

Parameter	Description
Tx Clock Source	Displays the transmit clock reference

Parameter	Description
Rx SSM	Displays the SSM carried by the received signal of the selected port. To view the list of supported SSMs, select **Rx SSM**
Tx SSM	Displays the SSM inserted by the selected port in the transmit signal. To view the list of supported SSMs, select **Tx SSM**

Displaying Flow Status

RICi-622GE allows you to view the status of the flows.

➤ **To display the flow status:**

1. From the Monitoring Application menu (**Main** › **Monitoring** › **Application**), select **Flows**.

   The Flow status screen appears (see *Figure 6-10*).

2. From the Flow status screen, select the flow and port for which you wish to view the status.

```
                          RICi-622GE
Monitoring>Application>Flows

     Flow Name                          (Flow1)

 1. Flow ID[1..16]                      (1)
 2. Port      …                         (ETH-1)
   Downstream Total Received            (408867)
   Downstream Forward Green             (408867)
   Downstream Forward Yellow            (0)
   Downstream Discard Yellow\Red        (0)


Please select item  <1 to 2>
C-Clear ; F-Forward ;

ESC-prev.menu; !-main menu; &-exit                    1 M/2 C
```

Figure 6-10. Flow Status Screen

Viewing Physical Layer Statistics

Displaying Ethernet Statistics

RICi-622GE allows you to display Gigabit Ethernet performance statistics.

➤ **To display the Gigabit Ethernet statistics:**

1. From the Monitoring Ethernet menu (**Monitoring** › **Physical Layer** › **Ethernet**), select **Statistics** to show the Ethernet statistics screen for the first Gigabit

Ethernet port (*Figure 6-11*). *Table 6-2* describes the Ethernet statistic counters.

2. Type **f** to advance to the Ethernet statistics screen for the next Gigabit Ethernet port.

```
                          RICi-622GE

Monitoring>Physical Layer>Ethernet>Statistics

    Port Label>                    (1)
    Ethernet Port                  (ETH-1)
    Counter                --- RX ---        --- TX ---
    Total Frames           (76856032)          (30)
    Total Octets           (116667458094)      (2673)
    Correct Frames         (76856033)          (30)
    FCS Errors             (0)                 (0)
    Jabber Errors          (0)                 (0)
    Fragments Errors       (0)                 (0)
    Undersized Frames      (0)                 (0)
    Oversized Frames       (0)                 (0)
    Collisions             (0)                 (0)
    Errors                 (0)                 (0)

Please select item 1
F-Forwards ; B-backwards
>

ESC-prev.menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-11. Ethernet Statistics Screen

Table 6-2. Ethernet Statistic Counters

Parameter	Description
RX	
Total Frames	Total number of frames received
Total Octets	Total number of octets received, including framing characters
Correct Frames	Number of frames successfully received
FCS Errors	Total number of frames received on a particular interface that are an integral number of octets in length, but do not pass the FCS check. This count does not include frames received with Frame-Too-Long or Frame-Too-Short error.
Jabber Errors	Total number of long frames received with invalid CRC
Fragments Errors	Total number of frames that are less than 64 octets in length (excluding framing bits, but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (alignment error)
Undersized Frames	Total number of received short frames with size under 64 bytes and with valid CRC
Oversized Frames	Total number of received long frames with size over 1518 bytes and with valid CRC

Parameter	Description
Collisions	Total number of collisions that occurred
Discard Frames	Total number of frames that were discarded even though no errors were detected
TX	
Total Frames	Total number of correct frames transmitted
Total Octets	Total number of octets transmitted, including framing characters
Correct Frames	Total number of frames successfully transmitted
FCS Errors	Total number of frames transmitted on a particular interface that are an integral number of octets in length, but do not pass the FCS check. This count does not include frames transmitted with Frame-Too-Long or Frame-Too-Short error.
Jabber Errors	Total number of long frames transmitted with invalid CRC
Fragments Errors	Total number of frames that are less than 64 octets in length (excluding framing bits, but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (alignment error)
Pause Frames	Total number of transmitted pause frames (indicate pause in transmission needed due to congestion)
Undersized Frames	Total number of transmitted short frames with size under 64 bytes and with valid CRC
Oversized Frames	Total number of transmitted long frames with size over 1518 bytes and with valid CRC
Collisions	Total number of occurred collisions
Discard Frames	Total number of discarded frames
Errors	Total number of transmission errors

Displaying SDH/SONET Statistics

RICi-622GE allows you to display SDH/SONET statistics for SOH, HVC, and LVC.

➤ **To display the SDH/SONET statistics for SOH:**

1. From the Monitoring SDH/SONET menu (**Monitoring** › **Physical Layer** › **Statistics** › **SDH/SONET**), select **SOH** to show the SOH statistics screen for SOH-1 (*Figure 6-12*). *Table 6-3* describes the SDH/SONET statistic counters.
2. Type **f** to advance to the statistics for SOH-2.

```
                          RICi-622GE

Monitoring>Physical Layer>SDH/SONET >Statistics >SOH-1

                    ES    SES    UAS(SEFS)  CV     Elapsed Time
Current Interval    0     0      366        0      00:06:06
Interval 1          0     0      900        0      00:15:00
Interval 2          0     0      699        0      00:15:00
Interval 3          0     0      0          0      00:15:00
Interval 4          0     0      194        0      00:15:00
Interval 5          0     0      20         0      00:15:00
Interval 6          0     0      43         0      00:15:00
Interval 7          0     0      900        0      00:15:00
Interval 8          0     0      900        0      00:15:00
Interval 9          0     0      900        0      00:15:00
Interval 10         0     0      891        0      00:15:00

F-Forward; C-Clear Statistics
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 6-12. SDH/SONET SOH Statistics

➤ To display the SDH/SONET statistics for HVC:

1. From the Monitoring SDH/SONET menu (**Monitoring** › **Physical Layer** › **Statistics** › **SDH/SONET**), select **HVC** to show the HVC statistics screen for HVC-1-1 (*Figure 6-13*). *Table 6-3* describes the SDH/SONET statistic counters.
2. Type **f** to advance to the statistics for HVC-1-2, HVC-1-3, HVC-1-4.

```
                          RICi-622GE

Monitoring>Physical Layer>SDH/SONET >Statistics >HVC-1-1

                    ES    SES    UAS(SEFS)  CV     Elapsed Time
Current Interval    0     0      825        0      00:13:45
Interval 1          0     900    0          0      00:15:00
Interval 2          0     699    0          0      00:15:00
Interval 3          0     0      0          0      00:15:00
Interval 4          0     200    1          0      00:15:00
Interval 5          0     900    0          0      00:15:00
Interval 6          0     900    0          0      00:15:00
Interval 7          0     900    0          0      00:15:00
Interval 8          0     900    0          0      00:15:00
Interval 9          0     900    0          0      00:15:00
Interval 10         0     891    0          0      00:15:00

F-Forward; C-Clear Statistics
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 6-13. SDH/SONET HVC Statistics

➤ To display the SDH/SONET statistics for LVC:

1. From the Monitoring SDH/SONET menu (**Monitoring** › **Physical Layer** › **Statistics** › **SDH/SONET**), select **LVC**.

A menu is displayed where you can select the SDH/SONET link for which you want to view the LVC statistics.

```
                              RICi-622GE

Monitoring>Physical Layer>SDH/SONET >Statistics >LVC

 1. Link [1 – 2]                          ...    (1}
 2. Show Statistics                      []

>
Please select item <1 to 2>
F-Forward;
ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-14. SDH/SONET LVC Statistics, Link Selection

2. Select the desired SDH/SONET link.
3. Select **Show Statistics**.
4. The LVC statistics screen (*Figure 6-15*) appears. *Table 6-3* describes the SDH/SONET statistic counters.

```
                              RICi-622GE

Monitoring>Physical Layer>SDH/SONET>Statistics>LVC>Show Statistics 1:1:1

                  ES      SES       UAS(SEFS)   CV       Elapsed Time
Current Interval  0       0         825         0        00:13:45
Interval 1        0       900       0           0        00:15:00
Interval 2        0       699       0           0        00:15:00
Interval 3        0       0         0           0        00:15:00
Interval 4        0       200       1           0        00:15:00
Interval 5        0       900       0           0        00:15:00
Interval 6        0       900       0           0        00:15:00
Interval 7        0       900       0           0        00:15:00
Interval 8        0       900       0           0        00:15:00
Interval 9        0       900       0           0        00:15:00
Interval 10       0       891       0           0        00:15:00

F-Forward; C-Clear Statistics
ESC-prev. menu; !-main menu; &-exit                      1 M/2 C
```

Figure 6-15. SDH/SONET LVC Statistics

Table 6-3. SDH/SONET Statistic Counters

Term	Meaning
ES	Number of seconds during which one or more of the following faults occurred: • Severely Errored Frame (SEF) (also called Out of Frame (OOF)): A SEF defect is declared after detection of four contiguous errored frame alignment words. The SEF defect is terminated when two contiguous error free frame words are detected. • Loss of Signal (LOS) defect: A LOS defect is declared after when no transitions are detected in the incoming line signal (before descrambling) during an interval of 2.3 to 100 microseconds. The LOS defect is terminated after a 125 microsecond interval (one frame) during which no LOS defect is detected. • Loss of Pointer (LOP) defect: A LOP defect is declared after no valid pointer is detected in eight consecutive frames. The LOP defect will not be reported while an AIS signal is present. The LOP defect is terminated after a valid pointer is detected. • Alarm Indication Signal (AIS) received in the SDH/SONET overhead.
SES	Number of severely errored seconds (SES) in the current interval. A second is considered to be a severely errored second if multiple error events of the types described for ES occurred.
UAS(SEFS)	Number of unavailable seconds (UAS(SEFS)) in the current interval. An unavailable second is any second in which one or more SEF defects were detected
CV	Number of Coding Violations (CV) in the current interval: a coding violation is declared when a Bit Interleaved Parity (BIP) error is detected in the incoming signal. The BIP information is collected using the B1 byte in the Section Overhead.

Viewing Logical Layer Statistics

RICi-622GE allows you to display logical layer performance statistics.

➤ **To display Logical Layer Statistics:**

1. From the Monitoring Logical Layer menu (**Monitoring** > **Logical Layer**), select **Statistics** to show the logical layer statistics menu.
2. From the logical layer statistics menu, select the interval for which you wish to see statistics. *Table 6-4* describes the logical layer statistic counters.

```
                              RICi-622GE
Monitoring>Logical Layer>Statistics

1.   Current Interval                    >
2.   Select Interval                     >
3.   Total                               >

Please select item from 1 to 3

>

ESC-prev. menu; !-main menu; &-exit                        1 M/2 C
```

Figure 6-16. Logical Layer Statistics Menu

```
                              RICi-622GE
Monitoring>Logical Layer>Statistics>Current Interval

 Valid Intervals [0 – 96]               > (0)
 Elapsed Time(s)                        > (0)
 Number of Total Rx Frames              > (0)
 Number of Total Tx Frames              > (0)
 Rx Payload Max length violation        > (0)
 Rx Payload Min length violation        > (0)
 FCS error    >                         > (0)
 Receive Abort Frames>                  > (0)
 Byte De-stuffing violations            > (0)
 Receive Idle frame error               > (0)
 Receive cHEC single bit error          > (0)
 Receive PTI mismatch                   > (0)
 Receive EXI mismatch                   > (0)
 Receive UPI mismatch                   > (0)
 Receive tHEC single bit error          > (0)
 Receive tHEC multi bit error           > (0)
 Receive CID mismatch                   > (0)
 Receive eHEC single bit error          > (0)
 Receive eHEC multi bit error           > (0)


ESC-prev.menu; !-main menu; &-exit                         1 M/2 C
```

Figure 6-17. Logical Layer Statistics Screen

Table 6-4. Logical Layer Statistic Counters

Term	Meaning
Number of Total Rx Frames	Number of frames received in the current interval
Number of Total Tx Frames	Number of frames transmitted in the current interval
Receive cHEC single bit error	Number of frames received in the current interval with errors in the cHEC field of the header

Term	Meaning
Receive Payload Max length violation	Number of frames received in the current interval with payload fields exceeding the maximum allowed number of bytes
Receive Payload Min length violation	Number of frames received in the current interval with payload fields less than the minimum allowed number of bytes
FCS error	Number of frames received in the current interval with frame checksum errors
Receive tHEC multi bit error	Number of frames received in the current interval with multi-bit errors in the tHEC field of the header
Receive eHEC multi bit error	Number of frames received in the current interval with multi-bit errors in the eHEC field of the header
Receive PTI mismatch	Number of frames received with a mismatch in the PTI field (for example, PTI value doesn't correspond to the Client Data or Management frame)
Receive EXI mismatch	Number of frames received with a mismatch in the EXI field (for example, EXI value not equal to NULL or LINEAR modes).
Receive UPI mismatch	Number of frames received with a mismatch in the UPI field (for example, EXI value not equal to 00000001).
Receive CID mismatch	Number of frames received with a mismatch or unsupported value in the CID field

6.2 Handling Alarms and Traps

RICi-622GE maintains a cyclic event log file that stores all the events recorded during the past 24 hours, up to 256 events. All events are time-stamped.

Displaying Events

RICi-622GE allows you to display the event log.

➤ **To display the event log file:**

- From the Monitoring menu (**Monitoring** > **System**), select **Event Log**.

  The event log is displayed in the Event Log screen.

```
                                RICi-622GE
Monitoring>System>Event Log>

 Code    Port         Description            Status     Date          Time

 109              LOGIN su SERIAL           On         09-09-2007    08:22:47
 136              LOGIN FAILED me SERIAL    On         09-09-2007    08:22:42
 103   VCG-1      RX TRAIL FAILURE          On         09-09-2007    08:09:28
 89    L1 STS1-3  VC AIS OCCURRED           Off        09-09-2007    07:39:49
 89    L1 STS1-2  VC AIS OCCURRED           Off        09-09-2007    07:39:49
 89    L1 STS1-1  VC AIS OCCURRED           Off        09-09-2007    07:39:49
 34    L1 SOH     FRAME LOSS                Off        09-09-2007    07:39:54
 32    L1 SOH     SIGNAL DEGRADED ERROR     On         09-09-2007    07:40:12
 89    L1 STS1-3  VC AIS OCCURRED           On         09-09-2007    07:40:36
 89    L1 STS1-2  VC AIS OCCURRED           On         09-09-2007    07:40:36
 89    L1 STS1-1  VC AIS OCCURRED           On         09-09-2007    07:40:36

>

ESC-prev.menu; !-main menu; &-exit  ?-help                          1 M/2 C
```

Figure 6-18. Event Log

The events appear on the **Event Log** screen in the reverse order they were recorded in the log (the most recent event appears at the top of the list). *Table 6-6* describes the event log information:

Table 6-5. Event Log Parameters

Parameter	Meaning	Values
Code	Code assigned to alarm/event	Refer to *Table 6-7* for a description of alarm codes.
Port	Identifies the RICi-622GE port that generated the alarm or event.	1...max num of ports
Description	Text string that provides a concise description of the alarm condition or event.	
Status	Current status of alarm or event:	**On** – still present **Off** – no longer present
Date	The date the alarm or event was recorded in the log.	
Time	The time the alarm or event was recorded in the log.	

Clearing Events

RICi-622GE allows you to clear the event log file of all events.

➤ **To clear the log file:**

- From the Monitoring menu (**Monitoring** > **System**), select **Clear Event Log**.

  The event log is cleared of all events.

Displaying Alarms

RICi-622GE allows you to display the active alarms or all alarms.

➤ **To display the active alarms:**

- From the Monitoring menu (**Monitoring** > **System**), select **Active Alarms**.

  The active alarms are displayed. *Table 6-6* describes the alarm information.

```
                                RICi-622GE
Monitoring>System>Active Alarms

 Code     Port        Description              Severity     State   Count

 14       LINK-1      SIGNAL LOSS              Major        On       1
 50       ETH-02      LAN NOT CONNECTED        Major        On       1
 64       VCG-1       GFP OUT OF SYNC          Major        On       1
>


ESC-prev.menu; !-main menu; &-exit  ?-help                          1 M/2 C
```

Figure 6-19. Active Alarms

➤ **To display all alarms:**

- From the Monitoring menu (**Monitoring** > **System**), select **All Alarms**.

  All alarms are displayed. *Table 6-6* describes the alarm information.

```
                                    RICi-622GE
Monitoring>System>All Alarms

 Code     Port         Description              Severity     State    Count

 86                    RESET OCCURRED           Event        On        1
 14       LINK-1       SIGNAL LOSS              Major        On        1
 89       L1 STS1-3    VC AIS OCCURRED          Major        On        1
 50       ETH-02       LAN NOT CONNECTED        Major        On        1
 64       VCG-1        GFP OUT OF SYNC          Major        On        1
 103      VCG-1        RX TRAIL FAILURE         Major        On        1
 14       L1 SOH       SIGNAL LOSS              Major        Off       2
 34       L1 SOH       FRAME LOSS               Major        Off       2


>


ESC-prev.menu; !-main menu; &-exit  ?-help                          1 M/2 C
```

Figure 6-20. All Alarms

Table 6-6. Alarm Parameters

Parameter	Meaning	Values
Code	Code assigned to alarm	Refer to *Table 6-7* for a description of alarm codes.
Port	Port for which alarm is active	1...max num of ports
Description	Description of alarm	
State	State of alarm	On , Off
Severity	Severity of alarm	Critical, Major, Minor
Count	Number of times alarm occurred	1 .. Max Times

Table 6-7 describes the alarm messages generated by RICi-622GE. The alarm messages are listed in ascending order of their codes.

Table 6-7. Alarm Messages

Code	Message	Default Severity	Interpretation
1	POWER SUPPLY 1 FAILURE	Major	RICi-622GE reports failure of power supply module 1. Replace this power supply module.
2	ALARM BUFFER OVERFLOW	Major	More than 255 alarms have been received, and therefore the new alarms are overwriting the oldest alarms (the first alarms) stored in the alarm buffer. Read the alarms and then clear the buffer
3	HARDWARE FAILURE	Major	A technical failure has been detected. Replace RICi-622GE
4	Reserved for future use		
5	CLOCK CHANGE TO FALLBACK	Event	RICi-622GE has switched to the fallback clock source

Code	Message	Default Severity	Interpretation
6	CLOCK CHANGE TO INTERNAL	Event	RICi-622GE has switched to the internal clock source
7	CLOCK CHANGE TO MASTER	Event	RICi-622GE has returned to the master clock source
8, 9	Reserved for future use		
10	SP-PAR SWITCH IS ON	Minor	Section 1 of the internal switch SW1 is set to the OPEN position. This caused reloading of the default communication parameters for the supervisory terminal port (CONTROL connector). If it is no longer necessary to enforce the default parameter values, return this switch section to the CLOSE position
11, 12, 13	Reserved for future use		
14	SIGNAL LOSS	Major	The specified port of RICi-622GE reports loss of input signal
15 to 22	Reserved for future use		
23	LINE CODE VIOLATION	Event	A bipolar violation (BPV) error has been detected by the specified PDH port. This alarm may also appear when an excessive zeroes error occurs (more than three consecutive 0s for an E1 port, or more than 8 consecutive 0s for a T1 port using B8ZS zero suppression)
24	AIS OCCURRED	Major	The Alarm Indication Signal (AIS), a framed "all ones" sequence, is received by the specified PDH port, VC or VT. AIS on an E1 link is declared when less than three spaces (i.e., two or fewer zeros) are detected in a sequence of 512 bits (256 μsec window). AIS on a T1 link (blue alarm) is declared when less than five spaces are detected in a 3-msec window
25	Reserved for future use		
26	UPPER LAYER CRITICAL ALARM	Major	A critical error has occurred on an upper layer for the specified VC-4/STS-1
27	PAYLOAD LABEL UNEQUIPPED	Major	The specified VC-4/STS-1 receives an unequipped payload label (signal label). This alarm condition may often occur while a new trail is being prepared
28	PATH TRACE ID MISMATCH (TIM)	Major	The path trace ID received from the far end does not match the expected ID for the specified VC-4/STS-1. This may indicate incorrect routing of the corresponding VC-4/STS-1
29	PAYLOAD LABEL MISMATCH (PLM)	Major	A payload label mismatch has been detected for the specified VC-4/STS-1. This may indicate incorrect routing of the corresponding VC. This alarm condition may often occur while a new trail is being prepared
30	REMOTE DEFECT INDICATION (RDI)	Major	RDI (Remote Defect Indication) is received from the remote equipment through the specified STM-4/OC-12 link

Code	Message	Default Severity	Interpretation
31	LOSS OF POINTER	Major	The STM loss of pointer (LOP) state is entered when N consecutive invalid pointers are received by the specified VC-4/ STS-1. LOP state is exited when 3 equal valid pointers or 3 consecutive AIS indications are received
32	SIGNAL DEGRADED ERROR	Minor	The bit error rate of the received STM-4/OC-12, VC-4, or STS-1 signal exceeds the preset signal-degraded threshold
33	EXCESSIVE BIT ERROR RATE	Major	The bit error rate of the received STM-4/OC-12, VC-4, or STS-1 signal exceeds the preset excessive BER threshold
34	FRAME LOSS	Major	The loss of frame (LOF) state is entered when an out-of-frame (OOF) state exists at the specified STM-4/OC-12 port for up to 3 ms. If OOFs are intermittent, the timer is not reset to zero until an in-frame state persists continuously for 0.25 ms. The LOF state is exited when an in-frame state exists continuously for 1 to 3 ms
35	TX FAIL (TX PWR OUT OF RANGE)	Major	The laser TX power monitor reports a value that exceeds the high alarm level
36	TX DEGRADE (LASER BIAS)	Major	The laser bias monitor reports a value that exceeds the high alarm level, and may degrade the laser performance
37	Reserved for future use		
38	STM OUT OF FRAME	Major	Loss of frame alignment for the specified STM-4/OC-12 port
39	Reserved for future use		
40	STM PATH TRACE UNEQUIPPED	Minor	The specified VC has received an unequipped path trace label. This alarm condition may often occur while a new trail is being prepared
41 to 48	Reserved for future use		
49	FAN FAILURE	Minor	The internal cooling fan of RICi-622GE is not operating. Replace the unit as soon as possible
50	LAN NOT CONNECTED	Major	The LAN interface of RICi-622GE is not connected to an active Ethernet LAN (this alarm will not appear when the corresponding LAN port is disabled by the user). Check the connection between the LAN port and the LAN media, or hub port, and make sure that the LAN equipment is operating normally, and at least one station is active on the LAN
51	TX LCAS ADD NORMAL TIMEOUT	Event	When using LCAS, timeout occurred when waiting to transmit an ADD NORMAL message
52	RX LOSS OF SEQUENCE	Event	The sequence number of a received LCAS message is out of sequence
53	RX LCAS CRC ERROR	Event	A CRC error has been detected in an LCAS message
54	Reserved for future use		
55	MAC RX FIFO BUFFER OVERFLOW	Event	The rate of frame ingress from the WAN (from the STM-4/OC-12 link) exceeds the egress rate to the local LAN.

Code	Message	Default Severity	Interpretation
56 to 59	Reserved for future use		
60	RX LAPS/FRAME MISMATCH	Minor	This alarm indicates a mismatch in the ADDRESS, CONTROL, or SAPI fields of the received LAPS/LAPF frame. This alarm is set (ON) after the detection of any one of these errors and is reset (OFF) after the user displays the statistics counters.
61, 62	Reserved for future use		
63	NUMBER OF VCS UNDER MINIMUM	Major	When using LCAS, the number of active VCs per group can be changed dynamically. This alarm is set (ON) when the number of active VCs drops below the minimum configured value (defined in the Logical Layer Configuration menu), and is reset (OFF) after the failed VCs recover, or the configuration is changed
64	GFP OUT OF SYNC	Major	When GFP is used, the GFP multiplexer subsystem serving the LAN interface has lost synchronization to the incoming stream
65	DIFFERENTIAL DELAY EXCEEDS MAX	Major	This alarm is set (ON) when the differential delay exceeds the maximum delay configured in the database for the corresponding virtual group, and is reset (OFF) when the delay decreases below the maximum value.
66	TX LCAS ADD ACK TIMEOUT	Event	When using LCAS, timeout occurred when waiting to transmit an ADD ACK message
67	TX LCAS REMOVE ACK TIMEOUT	Event	When using LCAS, timeout occurred when waiting to transmit a REMOVE ACK message
68	GFP CHANNEL ID MISMATCH	Event	The GFP multiplexer subsystem has detected an unexpected channel number (CID)
69	CLOCK FAIL	Major	The internal clock oscillator serving the STM-4/OC-12 ports failed
70	LOSS OF MULTIFRAME	Major	Loss of multiframe synchronization occurred on the specified VC-4/STS-1
71	Reserved for future use		
72	SOFTWARE DOWNLOAD FAIL	Event	Software downloading to RICi-622GE failed. Repeat the process
73	NETWORK LINE LOOPBACK	Major	The alarm is set (ON) when a network-initiated line loopback has been activated on the corresponding port. This loopback cannot be disconnected by the system management. The alarm is reset (OFF) after the loopback is deactivated
74	SOFTWARE DOWNLOAD	Event	Software is being downloaded to RICi-622GE
75	FLIP OCCURRED	Event	Flipping to the alternate path occurred
76	REMOTE FAIL INDICATION	Major	A remote fail indication has been received by the specified VCG.
77	CLK IS DIFF FROM MASTER CLK	Major	RICi-622GE is not using the clock source selected as master source. This indicates a major failure in the source that provided the master clock source
78	UPPER LAYER CRITICAL ALARM	Minor	A critical error has occurred on an upper layer for the specified VCG.

Code	Message	Default Severity	Interpretation
79	PAYLOAD LABEL UNEQUIPPED	Minor	The specified VCG has received an unequipped signal label. This alarm condition may often occur while a new trail is being prepared
80	PATH TRACE ID MISMATCH (TIM)	Minor	The path trace ID received from the far end for the specified VCG does not match the expected value. This may indicate incorrect routing of the corresponding VC or VT.
81	PAYLOAD LABEL MISMATCH (PLM)	Minor	A payload label mismatch has been detected for the specified VCG. This may indicate incorrect routing of the corresponding VC or VT. This alarm condition may often occur while a new trail is being prepared
82	REMOTE DEFECT INDICATION(RDI)	Minor	RDI (remote defect indication) is received through the specified VCG
83	SIGNAL DEGRADED ERROR	Minor	The bit error rate of the signal received through the specified VC or VT exceeds the preset signal-degraded threshold
84	EXCESSIVE BIT ERROR RATE	Minor	The bit error rate of the signal received through the specified VC or VT exceeds the preset excessive BER threshold
85	JITTER BUFFER OVERFLOW	Event	The specified jitter buffer has reported an overflow event
86	RESET OCCURRED	Event	RICi-622GE has been reset
85	Reserved for future use		
88	CABLE TYPE MISMATCH	Major	The cable type connected to the E1 port connector is not suitable for the configured interface type. Check and correct in accordance with the equipment connected to the port connector
89	VC AIS OCCURRED	Major	The Alarm Indication Signal (AIS indication) has been received through the Signal Label (C2) byte of the specified VC-4/STS-1
90 to 96	Reserved for future use		
97	SFP FAILURE	Major	The SFP module has been removed, or has failed
98	FAR END CSF ERROR	Major	Far end CSF indication (detection of a CSF indication), displayed by ports with **Fault Propagation** enabled. This condition is cleared on receipt of the first valid GFP client data frame, or after failing to receive 3 CSF indications in 3 seconds
99	RESET TO ACTIVATE NEW SOFTWARE	Major	The alarm appears (ON state) after software download has been successfully completed, but RICi-622GE has not yet been reset. It disappears (OFF state) after resetting or restarting RICi-622GE
100	TX DEGRADE(LASER TEMPERATURE)	Major	The SFP laser temperature monitor reports a value that exceeds the high alarm threshold
101	CLOCK OUT OF RANGE	Major	The frequency of the timing reference clock is not within the allowed range
102	POWER SUPPLY 2 FAILURE	Major	RICi-622GE reports failure of power supply module 2. Replace this power supply module

Code	Message	Default Severity	Interpretation
103	RX TRAIL FAILURE	Major	Failure indication associated with a VCG, generated when a fault condition is detected on the path serving the VCG. The reception of this indication triggers the fault propagation process. This failure indication is necessary only when LCAS is not used
108	LOGIN ‹user› ‹access type›	–	The specified user logged in using the specified access type. The access types are: **SERIAL**, **TELNET**, **WEB**.
128	LOGIN FAILED ‹user› ‹access type›	–	The specified user was unsuccessful at logging in using the specified access type. The access types are: **SERIAL**, **TELNET**, **WEB**.

6.3 Troubleshooting

Consult this simple troubleshooting chart to localize a problem in RICi-622GE.

To correct the reported problem, perform the suggested remedial actions. If the problem cannot be fixed by carrying out the suggested actions, contact RAD technical support.

Table 6-8. Troubleshooting Chart

Fault/Problem	Probable Cause	Remedial Action
RICi-622GE unit is "dead" (PWR LED is off)	No power	Check that both ends of the power cable are properly connected.
SDH/SONET ON LINE LED is off	SDH/SONET Rx path failure	1. Check SDH/SONET statistics. 2. For SDH/SONET, upon AIS, check remote unit status. 3. Check fiber or cable and Rx levels and remote unit Tx level.
SDH/SONET ON LINE LED blinks	SDH/SONET Tx path failure	1. Check SDH/SONET to verify RDI received. 2. Check Tx optical power to see if in range. If out of range, send for repair. 3. Check fiber.
Ethernet LINK LED is off	Ethernet cable problem	1. Check Ethernet cable to see if cross or straight cable is needed. 2. Check/replace Ethernet cable. 3. Check range to be within limits. 4. Check RICi-622GE port by connecting to a different port switch at the remote end. 5. Send device for repair.

Fault/Problem	Probable Cause	Remedial Action
Ethernet service problems (End-to-End loss of Ethernet frames)	Physical layer problems	1. Check SDH/SONET statistics. 2. Follow remedial action described in SDH/SONET ON LINE LED is off and SDH/SONET ON LINE LED blinks. 3. Check Ethernet statistics. Late collisions may result with different duplex modes in RICi-622GE and Ethernet switch/device. 4. Check rate, duplex, and autonegotiation in RICi-622GE and Ethernet device. CRC errors may indicate range/cable problems.

6.4 Testing RICi-622GE

You can test RICi-622GE in the following ways:

- Perform remote or local diagnostic loopback
- Ping a remote host
- Trace route to a remote host.

Running Diagnostic Loopbacks

RICi-622GE supports two loopback types:

- Remote loopback that tests the connection between the STM-4/OC-12 ports and the SDH/SONET network. In this test, data coming from the SDH/SONET network is looped back to the SDH/SONET network (see *Figure 6-21*).
- Local loopback that tests the STM-4/OC-12 port function. In this test, data coming from the port is looped back to the port (see *Figure 6-22*).

The local and remote loopbacks are closed in the framer.

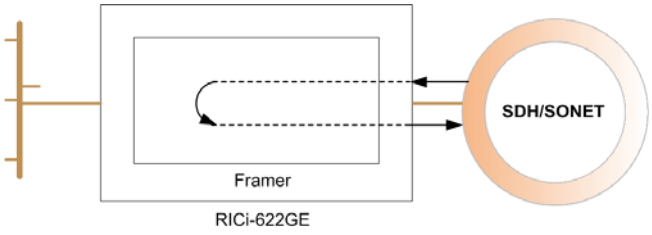


Figure 6-21. Remote Loopback

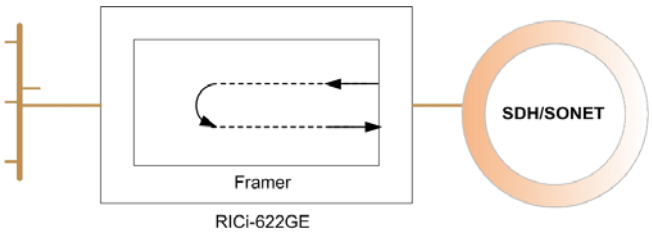


Figure 6-22. Local Loopback

➤ **To run a loopback:**

1. From the Diagnostic SDH/SONET menu (**Diagnostic›Physical Layer›SDH/SONET**), select **Interface**.
2. Select the port for which to run the loopback.
3. From the Interface menu, configure the following:
   - **Test** – Specifies the type of loopback that you wish to run (**No Test**, **Local Loopback**, or **Remote Loopback)**
   - **Timeout** – Specifies the period of time after which the loopback is automatically disabled.

```
                          RICi-622GE

Diagnostic>Physical Layer>SDH/SONET>Interface

1. Port                                    > (Link-1)
2. Test                                    > (Remote Loopback)
3. Timeout                                 > (Infinite)


>

Please select item from 1 to 3
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 6-23. Diagnostic SDH/SONET Menu

➤ **To disable diagnostic loopback:**

- From the Diagnostic SDH/SONET Interface menu (**Diagnostic › Physical Layer › SDH/SONET › Interface**), select **Test** and set it to **No test**.

Running a Ping Test

You can ping a remote IP host to check the IP connectivity.

➤ **To ping an IP host:**

1. In the Main menu, navigate to **Diagnostics › Ping Test › Ping**.

   The Ping menu appears as illustrated in *Figure 6-24*.
2. In the Ping menu, configure the following:
   - **Destination IP Address.** This is the IP address of the host that you intend to ping. Use values between 0.0.0.0 and 255. 255. 255. 255.
   - **Number of Frames to Send.** Select 0 to send a continuous stream of frames, or 1-50 to send a specified number of frames.
3. To start sending pings, select **Send Ping**.

   The results are displayed in the lower scrolling message window.

```
                          RICi-622GE
Diagnostics > Ping

1. Destination IP Address               ... (0.0.0.0)
2. Number of Frames to Send [0 - 50]    ... (4)
3. Send Ping

>
Please select item from 1 to 4
ESC-Previous menu; !-Main menu; &-Exit  ?-Help
```

Figure 6-24. Ping Menu

```
                          RICi-622GE
Diagnostics > Ping Test > Ping

1. Destination IP Address               ... (192.22.18.1)
2. Number of Frames to Send [0 - 50]    ... (4)
3. Send Ping

>
ESC-prev. menu; !-main menu; &-exit                  1 M/2 C
------------------------------------------------------------
PING – Frame no. 1: Ping Timeout
PING – Frame no. 2: Ping Timeout
PING – Frame no. 3 Reply Successful
PING – Frame no. 4 Reply Successful
PING – Sent 4, Received 2, Lost 2
```

Figure 6-25. Ping Menu, Pings Sent

Tracing the Route

This diagnostic utility traces the route through the network from RICi-622GE to the destination host.

➤ To trace a route:

1. In the Main menu, navigate to **Diagnostics › Ping Test › Trace Route**.

   The Trace Route menu appears as illustrated in *Figure 6-26*.

2. In the Trace Route menu, select **Destination IP Address** and enter the IP address of the host to which you intend to trace the route.

3. To start tracing, select **Display Trace Route**.

   RICi-622GE starts tracing the route, displaying the IP addresses of all hop nodes, and **Stop Trace Route** is displayed instead of **Display Trace Route**.

4. To stop the tracing, select **Stop Trace Route**.

```
                          RICi-622GE
Diagnostics > Ping Test > Trace Route
1. Destination IP Address   ... (0.0.0.0)
2. Display Trace Route

>
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
```

Figure 6-26. Trace Route Menu

```
                          RICi-622GE
Diagnostics > Ping Test > Trace Route
1. Destination IP Address   ... (127.0.0.1)
2. Stop Trace Route

>
ESC-prev. menu; !-main menu; &-exit                    1 M/2 C
------------------------------------------------------------

TRACERT - Tracing Route to 127.0.0.1
TRACERT - 1   192.188.171.1
TRACERT - 2   192.188.171.3
```

Figure 6-27. Trace Route Menu with Display

6.5 Frequently Asked Questions

Q: If I forget my password, what should I do?

A: Reset the device via the Boot Manager, and contact technical support.

Q: Does RICi-622GE have a mechanism to prevent overloading/discarding frames?

A: RICi-622GE prevents frame discard as much as possible by holding a frame buffer at STM-4/OC-12 egress to absorb bursts. The buffer depth allows bursts at a Gigabit Ethernet rate of about **n** frames, where **n** is the buffer depth (in frames). The POS Tx default buffer depth is 1500 frames and can be configured to hold up to 3000 frames. (Contact technical support if you need to change the buffer depth.)

6.6 Technical Support

Technical support for this product can be obtained from the local distributor from whom it was purchased.

For further information, please contact the RAD distributor nearest you or one of RAD's offices worldwide. This information can be found at www.rad.com (offices – About RAD > Worldwide Offices; distributors – Where to Buy > End Users).

Appendix A
Connector Wiring

A.1 10/100/1000BaseT Connector

The RICi-622GE Gigabit Ethernet ports use either a fiber optic SFP interface or electrical interface. If the Gigabit Ethernet ports use electrical interfaces, they terminate in an RJ-45, 8-pin connector. The ports support MDI and MDIX modes.

Table A-1 lists the pin assignments if the port is operating in 10BaseT or 100BaseT mode.

Table A-2 lists the pin assignments if the port is operating in 1000BaseT mode. If autonegotiation is disabled (forced mode), you must swap the receive and transmit pins.

Table A-1. 10/100BaseT Pinout

Pin	Designation	Function
1	TxD+	Transmit Data input, + wire
2	TxD–	Transmit Data input, – wire
3	RxD+	Receive Data output, + wire
4,5	–	Not connected
6	RxD–	Receive Data output, – wire
7,8	-	Not connected

Table A-2. 1000BaseT Pinout

Pin	Designation	Function
1	BI_DAP	Pair A, + wire
2	BI_DAN	Pair A, – wire
3	BI_DBP	Pair B, + wire
4	BI_DCP	Pair C, + wire
5	BI_DCN	Pair C, – wire
6	BI_DBN	Pair B, – wire
7	BI_DDP	Pair D, + wire
8	BI_DDN	Pair D, – wire

A.2 MNG Connector

The RICi-622GE Fast Ethernet management port uses an electrical interface that terminates in an RJ-45, 8-pin connector. The port supports MDI and MDIX modes. Forced mode is not supported. *Table A-3* lists the pin assignments.

Table A-3. MNG Pinout

Pin	Designation	Function
1	RxD+	Receive Data output, + wire
2	RxD–	Receive Data output, – wire
3	TxD+	Transmit Data input, + wire
4,5	–	Not connected
6	TxD-	Transmit Data input, – wire
7,8	–	Not connected

A.3 Control Connector

The control terminal interface terminates in a V.24/RS-232 9-pin D-type female DCE connector. *Table A-4* lists the CONTROL connector pin assignments.

Table A-4. Control Connector Pinout

Pin	Function	Direction
1	Data Carrier Detect (DCD)	From RICi-622GE
2	Receive Data (RD)	From RICi-622GE
3	Transmit Data (TD)	To RICi-622GE
4	Data Terminal Ready (DTR)	To RICi-622GE
5	Signal Ground (SIG)	Common reference and DC power supply ground
6	Data Set Ready (DSR)	From RICi-622GE
7	Request to Send (RTS)	To RICi-622GE
8	Clear to Send (CTS)	From RICi-622GE
9	Ring Indicator (RI)	To RICi-622GE

Appendix B

Boot Sequence and Downloading Software

This appendix provides a description of the RICi-622GE boot procedure via an ASCII terminal for downloading software.

The RICi-622GE software is stored in flash memory in two sections, in the boot sector and in the file system. The boot sector holds a boot program that calls up the rest of the program from the file system.

The file system can hold two compressed copies of the RICi-622GE code. One copy is called the operating file, and the other is called the backup file. The operating file is the default-executable RICi-622GE code. The backup file is used whenever the operating file is absent or corrupted.

B.1 Booting RICi-622GE

RICi-622GE boots up automatically. After powering up, no user intervention is required, except when the user wants to access the file system to modify or update the software or the RICi-622GE configuration.

Accessing the Boot Manager

The Boot Manager menu is an option that allows the user to perform basic file transfer operations. These operations are all optional.

➤ **To access the Boot Manager menu:**

- Press **<Enter>** several times immediately after powering up RICi-622GE.

  The Boot Manager menu is displayed (see *Figure B-1*).

```
 Boot Version 1.01 (Oct 10 2007)
 Boot Manager Version 10.07 (Oct 10 2007)

0 - Exit boot-manager
1 - Dir
2 - Set active software copy
3 - Delete software copy
4 - Download boot manager or an application by XMODEM
5 - Format Flash
6 - Show basic hardware information
7 - Reset board
8 - System configuration.
9 - Download boot manager or an application by TFTP

Select:
```

Figure B-1. Boot Manager Menu

From the Boot Manager menu, you can:

- List all files stored in the flash memory
- Delete the operating file; the backup file becomes the operating file
- Download a new operating file (via XMODEM or TFTP); the previous operating file is saved as the backup file
- Display the basic hardware information (RAM, ROM size etc)
- Reset the RICi-622GE device
- Configure the RICi-622GE IP address, IP mask, and default gateway for the consecutive file download via TFTP.

If you choose to exchange or delete a file, you are prompted for confirmation.

B.2 Transferring Software Files

New software releases are distributed as separate files, which are downloaded to RICi-622GE using the XMODEM protocol or TFTP from the Boot Manager menu. Alternatively, you can download a new software release via TFTP, when the RICi-622GE management software is already running (**Main menu** > **File Utilities**).

Downloading Application Files via XMODEM

Downloading application files using the XMODEM protocol is performed from the Boot Manager menu.

➤ **To download application file via XMODEM:**

1. Configure your ASCII terminal or terminal emulation utility running on your PC to the 115.2 kbps data rate.
2. Access the Boot Manager menu.

The Boot Manager menu appears (see *Figure B-1*).

3. From the Boot Manager menu, select **Download Files or an Application by XMODEM**.

   RICi-622GE displays the following message:
   `Select Copy number for download ( 0 )`

4. Select the backup partition by typing its number, **0** or **1**.

   RICi-622GE responds with the following string:
   `Please start the XMODEM download.`

5. Send the software release file to RICi-622GE using the XMODEM utility of you terminal application.

   Once the downloading is completed, RICi-622GE saves the new release as an active partition, the former active partition turns into backup, and the boot sequence continues normally.

   If a failure occurs during the download, the partially downloaded software is erased. In this case, only active software is left in the flash memory.

Downloading Application Files via TFTP

➤ **To download application file via TFTP:**

1. From the Boot Manager menu, select **System Configuration**.
2. Configure the IP parameters of RICi-622GE (IP address, IP mask and default gateway). These parameters are valid only for the TFTP file transfer via the Boot Manager and can be changed later.
3. Reset RICi-622GE
4. Start a TFTP application.
5. Configure the connection timeout of the TFTP server to be more than 30 seconds to prevent an automatic disconnection during the backup partition deletion (about 25 seconds).
6. Select a local software release file to download.
7. Enter the TFTP server address.
8. Start downloading.

   RICi-622GE automatically erases the backup partition (it takes about 25 seconds). Once the downloading is completed, RICi-622GE saves the new release as an active partition, and the former active partition becomes the backup.

Index

AC/DC Adapter (AD) Plug

for DC Power Supply Connection

Note *Ignore this supplement if the unit is AC-powered.*

Certain units are equipped with a wide-range AC/DC power supply. These units are equipped with a standard AC-type 3-prong power input connector located on the unit rear panel. This power input connector can be used for both AC and DC voltage inputs.

For DC operation, a compatible straight or 90-degree AC/DC Adapter (AD) plug for attaching to your DC power supply cable is supplied with your RAD product (see *Figure 1* and *Figure 2*).

Connect the wires of your DC power supply cable to the AD plug, according to the voltage polarity and assembly instructions provided on *page 2*.

Figure 1. Straight AD Plug

Figure 2. 90-Degree AD Plug

Caution

Prepare all connections to the AD plug **before** inserting it into the unit's power connector.

➤ **To prepare the AD plug and connect it to the DC power supply cable:**

1. Loosen the cover screw on the bottom of the AD plug to open it (see *Figure 3*).
2. Run your DC power supply cable through the removable cable guard and through the open cable clamp.
3. Place each DC wire lead into the appropriate AD plug wire terminal according to the voltage polarity mapping shown. Afterwards, tighten the terminal screws closely.
4. Fit the cable guard in its slot and then close the clamp over the cable. Tighten the clamp screws to secure the cable.
5. Reassemble the two halves of the AD plug and tighten the cover screw.
6. Connect the assembled power supply cable to the unit.

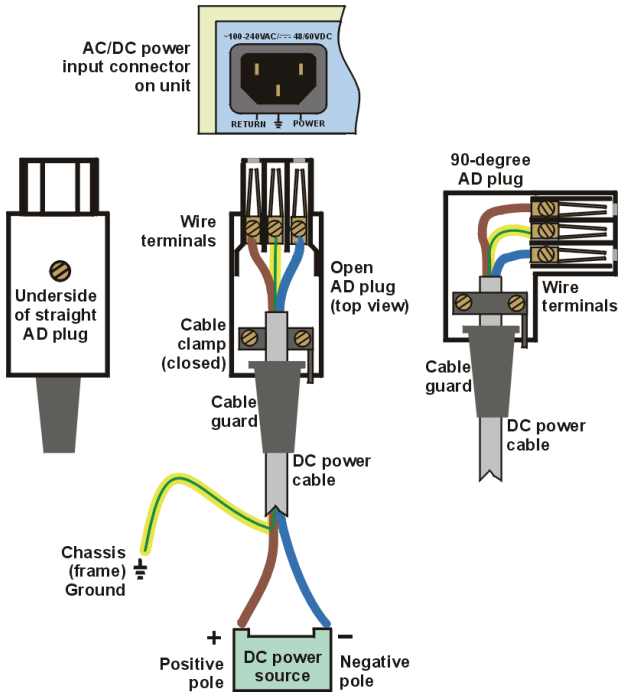


Figure 3. AD Plug Details

Warning

- **Reversing the wire voltage polarity will not cause damage to the unit, but the internal protection fuse will not function.**
- **Always connect a ground wire to the AD plug's chassis (frame) ground terminal. Connecting the unit without a protective ground, or interrupting the grounding (for example, by using an extension power cord without a grounding conductor) can damage the unit or the equipment connected to it!**
- **The AD adapter is not intended for field wiring.**

RAD

SUPPLEMENT

DC Power Supply Connection – Terminal Block Connector

Note: Ignore this supplement if the unit is AC-powered.

Certain DC-powered units are equipped with a plastic 3-pin *VDC-IN* power input connector, located on the unit rear panel. Different variations of the connector are shown in *Figure* 1. All are functionally identical.

Supplied with such units is a kit including a mating Terminal Block (TB) type connector plug for attaching to your power supply cable.

Connect the wires of your power supply cable to the TB plug, according to the voltage polarity and assembly instructions provided below.

Caution: *Prepare all connections to the TB plug* ***before*** *inserting it into the unit's VDC-IN connector.*

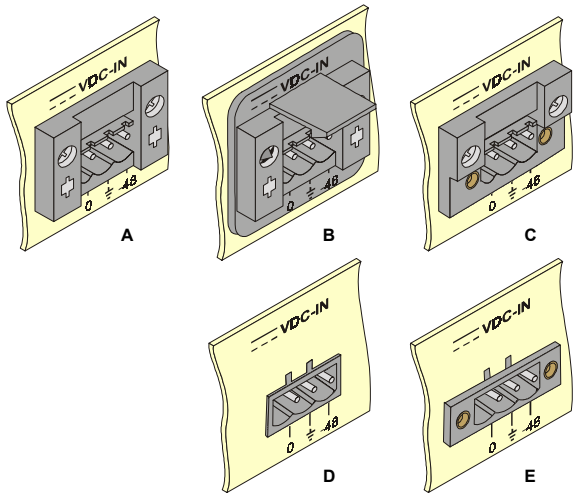


Figure 1. TB DC Input Connectors Types Appearing on Unit Panels

Preparing and Connecting the Power Supply Cable with the TB Plug

Refer to *Figure 2* for assistance.

1. Strip the insulation of your power supply wires according to the dimensions shown.
2. Place each wire lead into the appropriate TB plug terminal according to the voltage polarity mapping shown in *Figure 4.* (If a terminal is not already open, loosen its screw). Afterwards, tighten close the three terminal screws.
3. Pull a nylon cable tie (supplied) around the power supply cable to secure it firmly to the TB plug grip, passing the tie through the holes on the grip.
4. Isolate the exposed terminal screws/wire leads using a plastic sleeve or insulating tape, to prevent the possibility of short-circuit.
5. Connect the assembled power supply cable to the unit by inserting the TB plug into the unit's *VDC-IN* connector until it snaps into place.

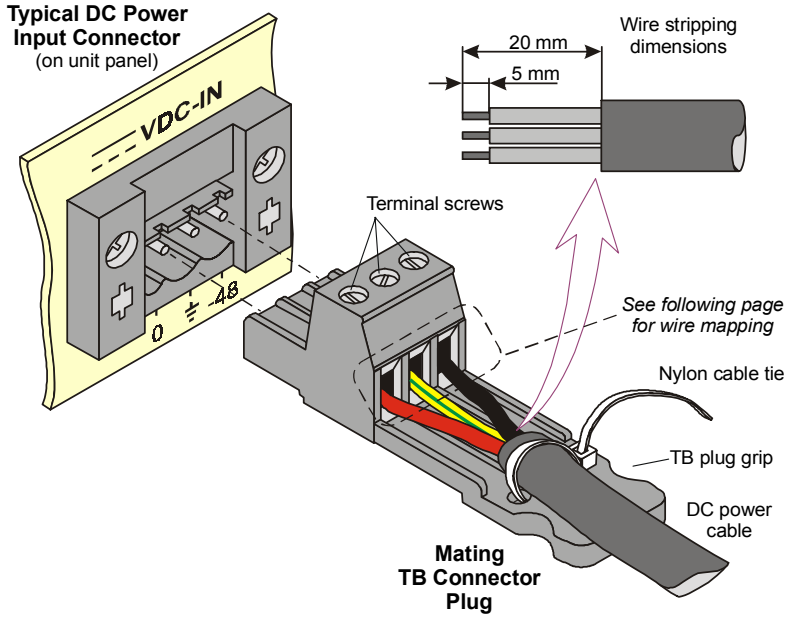


Figure 2. TB Plug Assembly

Note: Certain TB plugs are equipped with captive screws for securing the assembled cable's TB plug to the unit's *VDC-IN* connector (C and E types only). To secure the plug, tighten the two screws on the plug into the corresponding holes on the sides of the input connector as shown in *Figure 3*.

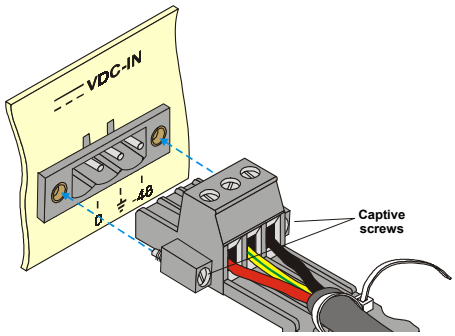


Figure 3. TB Plug with Captive Screws (optional)

DC Power Supply Wire Voltage Polarity

Refer to *Figure 4* for proper mapping of the power supply wire leads to the TB plug's three terminals.

> ***Warning:***
> - *Reversing the wire voltage polarity can cause damage to the unit!*
> - *Always connect a ground (earth) wire to the TB plug's Chassis (frame) Ground terminal. Connecting the unit without a protective ground, or interruption of the grounding (for example, by using an extension power cord without a grounding conductor) can cause harm to the unit or to the equipment connected to it!*

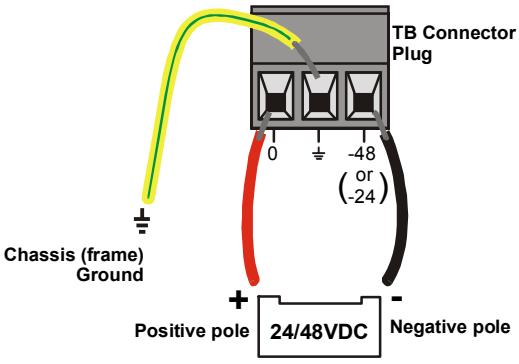


Figure 4. Power Supply Wire Mapping to TB Plug

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Customer Response Form

RAD Data Communications would like your help in improving its product documentation. Please complete and return this form by mail or by fax or send us an e-mail with your comments.

Thank you for your assistance!

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